



FRIDAY, FEBRUARY 13.

## The Late S. S. Merrill.

Sherburne S. Merrill was born July 28, 1818, near Alexandria, Grafton County, N. H., on the farm of his father. His father's wish was that he should remain on the old homestead and follow the life of a sturdy farmer, but the daily routine of such a life proved to be possessed of too much drudgery and too little opportunity for advancement to suit the young man's disposition, and at the age of 16 years he departed from the scene of his birth and took upon himself the responsibility of earning his own living. During the 17 years that followed, young Merrill found a variety of ways for employing his time, first as a hotel clerk, soon after as a clerk in Moses Kimball's furnishing house, Boston, and finally as part owner of a woolen manufactory at Bristol, N. Y. In the fall of 1851, Mr. Merrill, then 33 years old, came to Milwaukee, and immediately on his arriving here entered upon the life which he has since followed, and the career which has resulted in placing him among the highest of his profession in the West—that of a railroad.

As a railroad manager Mr. Merrill has for 15 years had a reputation which has extended even beyond the limits of this nation, and has been acknowledged to have no superior. His advancement from a humble position to the head of one of the most powerful corporations in this country, the Chicago, Milwaukee & St. Paul Railway, was in one sense rapid, yet not attained without a severe struggle, and he was subjected to many hard knocks. While possessed of the natural ability which entitled him to the promotions which he has won, he would never have attained his high position had it not been for a spirit of pluck and determination rarely equaled. Soon after Mr. Merrill's arrival in Milwaukee, 33 years ago last fall, he was placed in charge of a construction train on a road being built from Milwaukee toward the Mississippi River, now a part of the Prairie du Chien Division of the Milwaukee & St. Paul Railroad, and then known as the Milwaukee & Waukesha Railroad. The vim and energy which he displayed in carrying out this and other work intrusted to him during the remainder of that year and the year following did not pass unnoticed by his superiors, and within two years from the date of his work upon the railway he was given the appointment of Assistant Superintendent (under E. H. Brodhead), having in the meantime passed through the experience of trainman on both freight and passenger trains.

This position he held until the road was completed to Prairie du Chien, April 15, 1857. At that time he was tendered and accepted the superintendency of the Milwaukee, Watertown & Baraboo Valley Railroad, which to-day constitutes a portion of the La Crosse Division of the Milwaukee & St. Paul system. He retained this position for five years.

The old La Crosse road having been completed through to the Mississippi, Mr. Merrill accepted a position as its Superintendent. It was during these days that the great manager of later years encountered obstacles which would have completely discouraged many men, and which put his possession of grit to the severest test. Not only was he unfortunate in working under a man whom it was very difficult to please, but he was compelled to contend with the still more disagreeable condition of being associated with those who were very jealous of the success which had attended his career.

With this condition of affairs matters went from bad to worse, and Mr. Merrill, becoming convinced that the road's manager was totally lacking in appreciation, no matter how great an effort to please was made, severed his connection with that road, and took charge of the Winona & St. Peter, which has since passed into the hands of the Chicago & Northwestern. Here Mr. Merrill remained until the La Crosse and the Milwaukee & Mississippi roads were consolidated, at which time Alexander Mitchell was elected President of the new board of directors.

The story is told by old-time railroaders that when Mr. Mitchell was tendered the Presidency he announced his acceptance on the one condition that he should name the man to serve the road as general manager, and when questioned as to who the man would likely be, replied: "A man who in the railway profession is destined to rank at the head, Sherburne S. Merrill."

Whether this tradition is true or not, Mr. Mitchell occupied the Presidency and Mr. Merrill was chosen as general manager of the road. He was thus placed in a position where his abilities and efforts were appreciated, and from that hour he gradually rose in prominence as a railway manager until he attained a reputation which was outranked by none.

## ANECDOTES.

Among others the following anecdotes are related of the deceased gentleman:

A gentleman from the East called at headquarters one day to see the manager, but he was not in. He said he had some very important business to transact, and must see Mr. Merrill. The reply of a clerk was that the manager was attending a funeral, and could not be seen until late in the afternoon. "Has a member of his family died?" asked the caller. The reply was in the negative. "Is it anybody connected with the road?" "Yes." "Who, may I ask?" "Peter, the colored porter on Mr. Merrill's private car." The man had served him long and faithfully, and Mr. Merrill was determined to be at his funeral.

Some time ago complaint was made from a station 40 or 50 miles west of Milwaukee that the company's wood was being stolen. "Catch the thief," was Mr. Merrill's order. He was caught a night or two afterward, and proved to be the son of a widow. The manager asked that the boy and his mother be brought to Milwaukee. "Why did you steal that wood?" asked the manager. "Because we were freezing, sir," they replied in one voice. The station agent was questioned by telegraph, and replied that the woman was generally considered worthy. Dictating his reply to the operator, the old man said: "Well, you let her have what wood she needs for the winter," and, handing the pair passes to return, he told them that he would not prosecute them, and bade them good-day.

An engineer on the road who has been in its employ a long time, lost a favorite child, and like many another foolish man, tried to drown his sorrow by drinking. He lost his position and became an abject drunkard. Mr. Merrill heard of his case, and one day meeting the man on the street he stepped up to him, offered him his hand, and inquired: "Isn't it about time you took to your engine again?" The engineer could only stammer out his surprise. "Now go to your engine," said Mr. Merrill, "and run her straight. You know how to do it as well as anybody. Remember now, run her straight. Will you do it?" The man promised, and he is to-day in the employ of the road, a sober and respected official.

The inspector of clerks and headquarters, whose duty it was to report any remissness to Mr. Merrill, stated that one clerk was behind in his work, and that he was frequently quite late in coming to the office. Mr. Merrill sent for the young man and said to him sharply: "Look here, young man, you are away behind with your work, and you are frequently late at

the office. What is the reason for this?" The clerk resolved to make a clean breast of the matter and said: "The truth is I've got a sick wife, and I have to sit up with her and do my housework besides. I am not fit to do any work as it ought to be done." The manager busied himself with his papers for a few moments, and then turning to the young man, said: "You take your coat and go home, and stay there until your wife is better. If you need any money, come to me." The clerk tried to say something, but the old man waived him off with, "Go on, now, and take care of your wife."—Chicago Inter-Ocean.

## Steel-Tired Wheels.

The New England Railroad Club held its regular monthly meeting Jan. 28, President F. D. Adams in the chair. The subjects for discussion were: "Do the facts in relation to the safety and economy of the steel-tired wheel for engines and cars warrant its universal adoption; and is there a difference in the durability and relative value of the various kinds," and, "Do wrought-iron brake-shoes damage steel wheels more than cast iron?"

The President, Mr. F. D. ADAMS, opened the meeting in a few general remarks explaining its purpose.

Mr. H. A. LITTLE read a paper contributed by Mr. W. R. Ellis, an abstract of which follows:

The fact seems generally admitted that there is a demand for a steel-tired engine and car wheel. This is proved by the fact that over 100,000 are now on trial in the United States. This demand is general. In this, unquestionably, the railways are in the first place looking for absolute safety, which seems to be attainable, judging from the records of other countries, where steel-tired wheels are almost universally used. This being the chief cause of the demand, it is evident that no form of wheel should be adopted which does not make safety certain, or at least reduce the liability to accident. If a steel-tired wheel of 33 in. diameter, with tire 2½ in. thick, costing \$50 or more, does not increase safety, it is difficult to see what other advantages can make it economical.

We are as yet in the experimental stages of this question, as shown by the fact that, apparently, the question as to what steel tires can do as compared with the chilled tread of cast-iron wheels is considered of the most importance. That question concerns the tire-makers. Makers of cast-iron wheels now sell their wheels on a mileage basis. The tire-makers should do the same, or at all events should make clear as soon as possible what steel tires under the different conditions can or ought to do. There are only a few makers of tires, but more than a dozen steel-tired wheels are now prominent, and new patterns are being devised every day. Only one or two wheel-makers make their tires, and, speaking generally, they can use any which may be specified. Records of wheel service are not yet satisfactory or conclusive, and are only beginning to be properly examined and analyzed. No records of engine wheel service are produced, and the records of car wheels are kept uniformly on only one or two lines, and the same records frequently cover several makes of steel, by each of three processes, all on the same pattern of wheels.

What is of most importance to wheel-makers, who can use any steel which may be required, is to have all the points bearing on the entire wheel brought forward as soon as possible. Here we have a wheel guaranteed to run 400,000 or 500,000 miles, costing \$30, and another guaranteed to do the same, costing \$90, and it is a tire presumably of the same thickness in each case which is doing the work. What makes the enormous difference in cost? It cannot be the tire, but is in the design of the wheel itself, and as the steel-tired wheel is undoubtedly to be a permanent element of railroad equipment (the sales increasing in spite of the ignorance as to what is wanted of them or what they can do), and as all can do the same work, so far as tires are concerned, what we want to know is, what is there in a steel-tired wheel, or what is required of one, besides mere mileage service, and what are these other properties worth?

Dr. H. O. MARCY, of the Allston Car Wheel Co., gave an account of his company's process and Mr. Nathan Washburn's connection therewith. In 1849 Mr. Washburn patented the double-plate chilled-iron car wheel, which made a revolution in the manufacture of wheels. Several millions of profit accrued to the holders of the patent, and this same method of making iron car wheels is yet in use. Mr. Washburn was himself, however, never satisfied with the result, and has expended over \$250,000 of his own money and a quarter of a century in the experimental study of steel and the making of car wheels.

Mr. Zadock Washburn, the present foreman of the Allston Car Wheel Co., was the inventor of the process of uniting the tire to the soft iron centre by intense fusion of the two metals. The tire of hammered and rolled steel is reheated until it is at or above the fusing point of cast iron, about 3,000 degrees F., then transferred to a mold in which the soft centre is cast. By this means the two metals become one and inseparable. The report of the wear of these wheels made here to-night by Mr. Adams will show many wheels with a remarkable record of mileage. They offer certain marked advantages, notably the wheel is of one piece and, as may be seen, the tire can be worn much longer or thinner than when bolted to the centre. Mr. Washburn, however, became satisfied after some years' experience that owing to the reheating the uniformity of the metal was often impaired and the product rendered thereby doubtful. This led to the belief that a tire could be cast and joined to a soft centre by a similar method of manufacture.

The fusion point of crucible steel is about 4,000 degrees F., and this allows the casting of a steel tire and its removal to another mold before it has cooled to the point of fusion of cast-iron. Thus the two metals, in the Washburn or Hartford wheel, are inseparable, and the wheel is one casting.

The hardness of the steel was effected by making it of a high grade of carbon (2 per cent.).

The Allston Car Wheel Co. has made about 10,000 of these wheels, which are running on all the roads in New England.

Dr. MARCY then detailed the favorable experience on various lines, which did not however include definite figures, and the further experiments which his company was making in the direction of manganese steel, etc.

Mr. F. D. ADAMS: We have been very much interested and instructed by the papers read, but very practical men would understand the value of the wheel better by the record of mileage than by a scientific discussion. The comparative cost and service of the various kinds is what we wish to know, and I simply desire to show the exact records of the different kinds. I wish it perfectly understood that I am simply stating facts without personally favoring one wheel beyond another.

Mr. ADAMS then presented the following statements:

Statement of Number of Various Steel-Tired Wheels in use on the Boston & Albany Railroad and the Mileage made between Turnings.

	33-in. Paper.	42-in. Paper.	42-in. English. Through.
In service.....	268	450	200
Removed for 1st turning.....	115	176	142
Av. mileage before do. ....	70,109	112,046	66,369
Removed for 2d turning.....	29	32	8
Av. mileage between do. ....	33,049	95,005	88,812
Removed for 3d turning.....	6	2	.....
Av. mileage between do. ....	52,642	78,858	.....

Many of the paper wheels have crucible steel tires. The

greater number of them are running under through cars, where the brake is comparatively seldom applied, resulting in greater mileage than when running in suburban service. The English wheels are principally in suburban service, where the constant application of the automatic brake has produced its effect, as indicated in mileage made. The average mileage made by these wheels running under through cars, before first turning, has been 92,387 miles, showing plainly the greater severity of suburban service upon wheels.

Statement of Number of Hartford Steel-Tired Wheels now running on Boston & Albany Railroad, and the Mileage made between Turnings.

6 wheels are running between.....	400,000 and 500,000 miles.
124 " " " " " " " " " " " "	300,000 " 400,000 "
424 " " " " " " " " " " " "	200,000 " 300,000 "
520 " " " " " " " " " " " "	100,000 " 200,000 "
469 " " " " " " " " " " " "	less than 100,000 "

1,543 wheels in all.

Before the first turning the mileage made has been as follows:

328 wheels.....	100,000 to 150,000 miles.
74 " " " " " " " " " " " "	150,000 to 200,000 "
52 " " " " " " " " " " " "	200,000 to 300,000 "

The following are now running without ever having been turned:

20 wheels between.....	150,000 and 200,000
17 " " " " " " " " " " " "	200,000 " 300,000
3 " " " " " " " " " " " "	300,000 " 400,000

During the year 103 of these wheels were condemned for passenger service, which had made an average mileage of 282,594 miles.

The 103 wheels averaged 109,264 miles before first turning.

The 98 wheels averaged 88,683 + miles after first and before second turning.

The 85 wheels averaged 59,455 + miles after second and before third turning.

The 62 wheels averaged 38,915 + miles after third and before fourth turning.

The 37 wheels averaged 40,911 + miles after fourth and before fifth turning.

The 14 wheels averaged 43,371 + miles after fifth and before sixth turning.

The 2 wheels averaged 32,278 + miles after sixth turning.

Mr. GEO. L. WHITNEY asked the cost of the different kinds of wheels.

A MEMBER said a 33 in. Hartford steel-tired wheel costs \$55; a 33 in. Allen paper wheel, \$75; a 33 in. English steel-tired wheel, \$65.

F. P. BARNES, of the Allen Paper Wheel Co., read the following extracts from the report of mileage made by paper wheels under the Pullman cars on the Pennsylvania Railroad.

Mileage made by Allen Paper Car Wheels under 20 Pullman's Palace Car Co.'s Cars on Pennsylvania Railroad, as per Statement of Dec. 23, 1884.

No. of wheels.	Average mileage.
204 running.....	202,266
70 stored.....	106,113
14 re-tired.....	247,544

185,680

Mileage made by Certain Allen Paper Wheels under 25 Pullman's Palace Car Co.'s Cars on Pennsylvania Railroad Line, as per Statement of Dec. 21, 1884.

No. of wheels.	Average mileage.
35 re-tired and condemned.....	342,904
67 stored.....	343,362
204 running.....	324,252

350,577

As it was but fair to presume the poorest tires had worn out first, the mileage of the wheels now remaining in service should far exceed those already condemned. The guarantee on the wheels was a minimum of 260,000 miles before retiring.

F. M. CURTIS (Old Colony Railroad): Are any reports of mileage of paper wheels except from those under Pullman cars? I believe it is well understood that the service is much less severe on wheels in through service than in suburban service. [Inquiry develops the fact that the wheels which had made the largest mileage at least were 42 in.—EDITOR RAILROAD GAZETTE.]

Mr. J. N. LAUDER: The inquiry is very pertinent. It has been, I think, a custom where roads have fancy cars run in through trains to mount them on steel-tired wheels, where perhaps the service is not so severe, and in consequence greater mileage is shown. I believe you ought to get certainly 33 per cent. more mileage out of wheels in through service than in suburban service. The weight carried also has something to do with the matter. It seems evident from Mr. Adams' report that the first wear of the wheel is the best, and I understand Mr. Barnes to say that the wheel-tires on the wheels of the elevated railroads are thinner than those used on surface roads. They would therefore have relatively more wear than a thicker tire. There is no evidence yet that the chilled wheel is not the cheapest.

Mr. J. T. GORDON, of the Concord Railroad, then presented a table of the wear of 30 in. tender wheels, Ford & Kimball's, showing an average mileage of 33,359 miles for 933 wheels, the record extending over some ten years.

Mr. W. W. SNOW pointed out that tender wheels had very hard service. Whether the tires were crucible or open-hearth steel was another important question.

Mr. J. COGHLAN, of the Boston, Revere Beach & Lynn Railroad, submitted a statement showing that, with the mileage of 20,000 which they were able to obtain for 28-in. chilled wheels, the comparative cost of wheels stood as follows:

Steel-tired wheels, at \$28 each, axles at \$9 each and returning at \$7, with \$2 for removing and teaming, 343,250 miles cost (deducting \$180 for value of old wheels and axles).....	\$1,242.50
Chilled wheels, including fitting, etc.....	\$2,345.00
Less value of old wheels, etc.....	450.00

1,825.00

Difference in favor of steel tires (or nearly one-third).....

\$582.50

Mr. J. M. FORD then read a careful paper on the subject, which we are obliged to condense.

He thought (1) facts do warrant the universal adoption of steel-tired wheels for heavy and rapid passenger traffic; (2), that there is a difference in the durability and relative value of the various kinds; (3), that wrought-iron brake shoes do damage steel wheels more than cast-iron.

A crucible steel tire of the best quality has a tensile strength of 120,000 lbs. per square inch, and has, properly carbonized, a durability in service the economic value of which is now beyond question. The materials comprising this metal resist the severest application of the forces which operate to flatten ordinary wheels, and this feature alone results in materially prolonging their life and service. Practical service to date results in an average mileage for 33-in. wheels of about 280,000 miles in passenger service, and this is sufficient to warrant the claim of economy in service. Many of the wheels, however, have been turned into freight service and will give from 50,000 to 75,000 miles more.

An open-hearth steel tire has a tensile strength of 80,000 lbs. to the square inch, or 33½ per cent. less than the crucible steel tire, and has a durability in service even less than in



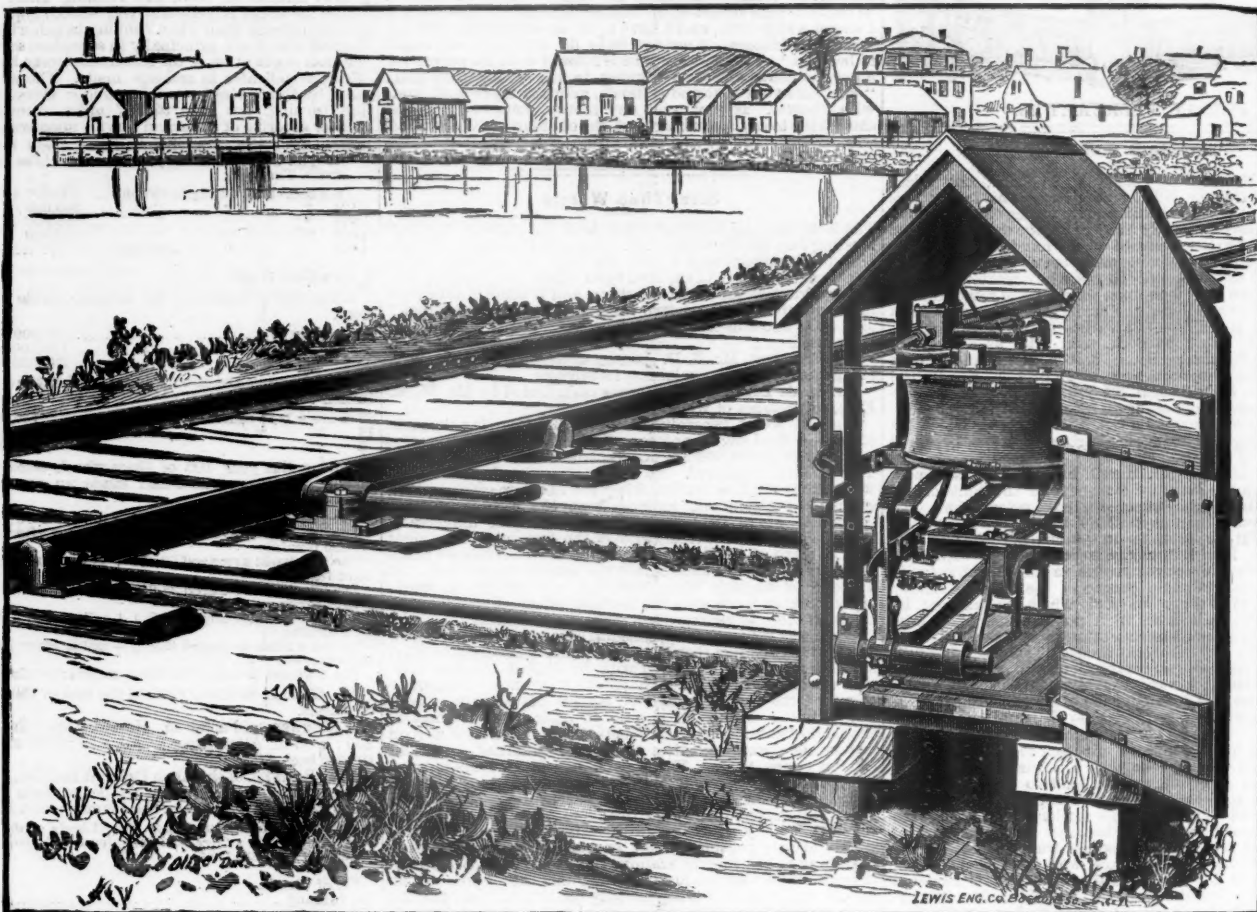


Fig. 1.

AMERICAN PNEUMATIC SIGNALS—END VIEW OF BELLWS AND HOUSE.

proportion to its strength, from the fact that its quality of metal is not of a sufficiently durable character to resist the application of the powerful automatic brake. These wheels would perhaps make a better showing where the conditions demand less severity of service.

Of the cast-iron wheel, the tensile strength is a doubtful quantity, perhaps from 18,000 to 30,000 lbs. to the square inch, according to quality, or from 75 to 85 per cent. less than the crucible steel tire. Out of 241 wheels removed from passenger service on through trains, but 51 were reported as worn out, or about 21 per cent., 79 per cent. being reported as shelled out, flatted, broken, etc. Out of 640 removed from freight service, but 91 were reported as worn out, or about 14 per cent.; 277 worn flat, or about 43 per cent.; 67 slid flat, or about 10 per cent.; 163 broken, or about 25 per cent.; the balance were removed for cut flanges, etc.

These facts alone ought to decide the question in favor of the steel-tired wheel; but lest they should fail I will submit a few other facts.

The last reliable record we have of the average mileage of the 33-in. cast-iron wheel was 29,074 miles, recorded in 1882. From this it appears that the steel-tired wheel will out-last nearly 10 chilled wheels.

The total cost of one pair of steel-tired wheels, with interest and cost of changing and turning, to run 282,594 miles has been, less scrap wheels, \$105 31. The total cost to run the same number of miles with the cast-iron wheels, with interest and cost of changing, has been, less scrap wheels, 215 39. Difference in favor of the steel-tired wheel, 50 08.

If records were obliterated, it might be safe to assert that cast-iron wheels, in point of economy, were equal or superior to steel-tired wheels for heavy and rapid traffic. They tell us the cast-iron wheel is guaranteed for 60,000 miles, and the guarantee is assumed to warrant this result. This is an enormous assumption. Put any guarantee upon the wheel you may choose, and its character is not changed.

As respects brake-shoes, the steel tire and the wrought iron brake-shoe hug closer and the fibres fit tighter and cling harder to each other when brought in violent connection than the cast-iron shoe, which, when brought into severe contact with the wheel, crumbles off and the granular form of the metal acts, as it were, as small friction balls between the two surfaces.

The greatly increased demand for something better than the chilled wheel comes from the great change in the duty thrown upon it. A comparative statement of the details of passenger cars in general service in 1863 and in 1884 shows the following:

	1863.	1884.	P. c.	P. c.
			inc.	dec.
Length of car-body in feet.....	30	57	90	..
Seating capacity.....	44	77	72	..
Weight of car-body.....	14,000	27,000	92	..
" " car-trucks.....	13,000	18,000	37	..
Total weight of car.....	27,000	45,000	66	..
Weight on each wheel without load.....	3,375	5,625	66	..
Weight of load (passengers) on each wheel.....	770	1,330	72	..
Total weight on each wheel when loaded up to its seating capacity.....	4,145	6,955	67	..
Weight of body to the foot.....	460	474	1	..
" " body and truck to the passenger.....	613	592	..	3
Rate of speed under which brakes are applied in miles.....	12	24	100	..
Weight of 33-in. cast-iron wheel.....	540	540	..	..
" " 33-in. steel-tired wheel.....	..	687	..	..

We find on examination of the above figures that the weight sustained by each wheel has increased 67 per cent. since 1863, although at that time cars had been built from 40 to 45 ft. long, and were rapidly superseding the old and shorter cars; but the difference in weight sustained is not the chief cause of the demand for a more durable and perfect wheel, but the difference in brake power used. The momentum per train now destroyed by brakes in an ordinary stop compares with what was usual in 1863 about as 221 to 36. The destructive

forces are thus six times greater. The cast-iron wheel cannot stand this extra service when exposed to frequent stops.

Mr. ADAMS: The Washburn Car Wheel Co.'s tires, being harder than many, will not flatten by sliding. The effect of sliding acts rather to harden the tire, than to change the roundness of the wheels, simply making small bright spots. We do not have any trouble with flats on these wheels. The small mileage of some of the wheels is occasioned in various ways. If we find wheels running to the flange, we take them out and true them up, and thus preserve the form with the least possible waste of material. If any other inequality of wear is discovered, we remove the wheel and true it up, and endeavor to ascertain the cause and apply the remedy.

Mr. Jos. W. FERGUSON, of the Bridgewater Iron Co., Bridgewater, Mass., described a wheel centre which his company is producing, consisting of two wrought-iron disks welded to a hub and a rim, the tire being shrunk on, into a tongue and groove formed in the rim and tire respectively.

After some further discussion the subject of "Interchange of Cars" was fixed on for the next meeting. Adjourned.

#### American Pneumatic Signals.

The system of signals herewith illustrated, that of the American Pneumatic Signal Co., of Boston, Mass., is an attempt to obtain the utmost simplicity in signal apparatus by making every part of it completely automatic except as it deteriorates by natural wear or by chance breakage. It is intended to be like a watch which winds itself by the motion of the body, requiring no winding up of weights, nor springs, nor care of batteries, nor technical skill to keep it going, other than is necessary for occasional inspection. It has been on trial for nearly 3 years on the Boston & Providence Railroad and over one year on the Old Colony and other railroads around Boston, and is reported to have worked for six months at a time without any interference, repair or adjustment whatever.

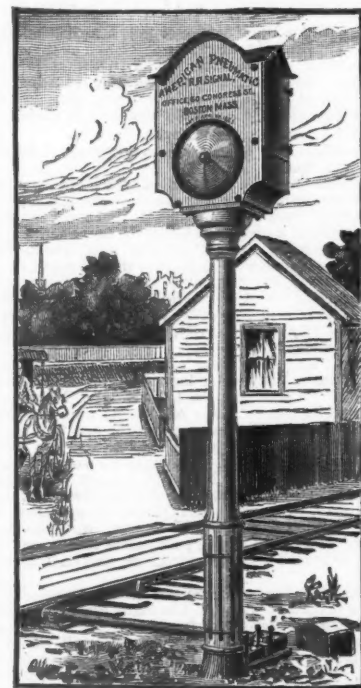
The essential features of the system are the use of the weight of the locomotive to actuate a bellows which sends a pulse or wave of slightly compressed air to the signals which it is desired to actuate. A similar wave of air from some other point reverses or stops the signals. Of compressed air, in the ordinary sense of the term, there is none. The power to operate the signals, after setting them in motion, may be obtained, obviously, from clock-work or electrical apparatus, or in any way desired, but in the plant designed by the company it is obtained directly from the weight of the locomotive acting upon levers similar to those used to actuate the bellows, but separate therefrom, the function of the pneumatic portion proper of the apparatus being simply to start and stop the signals, and not at all to actuate them. Very little power is required to simply move a stop, of course, and consequently very little compression of the air; hardly more than an undulation similar in its nature to, but, of course, much larger than, that which transmits sound.

The air pressure is transmitted through small pipes of lead or iron, preferably lead, to avoid corrosion. It is found that pipes  $\frac{1}{2}$  in. in diameter are sufficiently large, the pulse of air being transmitted through them at the rate of 1,800 ft. in three seconds. Two parallel pipes are sufficient to make a complete block system for either single or double track (figs. 1 and 2). A single pipe suffices to operate a crossing signal only. Within certain limits, as many signals as desired may

be actuated by a single beat of the "primary bellows." The most which the company now contemplate operating at once is six to eight.

The fundamental principles on which the device is based are not new, but it is claimed that this is the first system of the kind to sustain successfully a long practical test, owing to the excellence of its details. As proof of this, it is said that the first machine erected sustained the passage of 46,000 trains in 26 months without the bellows apparatus showing any perceptible deterioration, and at a total cost for repairs of \$13, most of which was for minor changes naturally required in a first experimental machine.

It is also claimed that the system is much the cheapest of any of those now prominent in first cost, as well as subsequent maintenance; that all parts are interchangeable, so that they may be kept in stock; that everything is inclosed in

Fig. 2.  
GONG POST.

iron houses, so as to be beyond injury from fire or weather, and that durability and simplicity of all the working parts has been secured as fully as is often possible. Breaks in the pipe are unlikely, since there is never any appreciable pres-

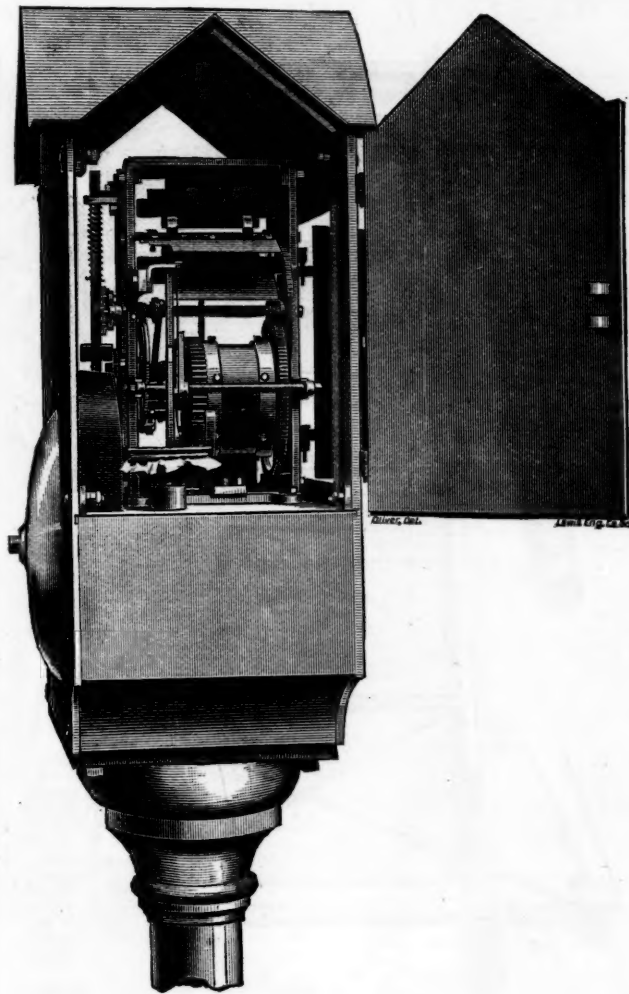


Fig. 3.

GONG-STRIKING MECHANISM.

sure in it; but any ordinary leak not amounting to complete rupture is not found to interfere with practical working.

The signals are intended to be used either at single highway crossings or in complete block signal systems, covering either the entire line or specially exposed and dangerous stretches only. In any case the practical operation is the same: A "primary bellows," fig. 1, operates a gong-striking mechanism, fig. 3, contained within a gong post, fig. 2, or, by mechanism essentially similar in character to that shown in fig. 2, operates the semaphore arms and sign or gate at grade crossings shown in fig. 4. As the same primary bellows will operate many signals, apparatus that may have been erected simply for crossing signals comes in play without essential change as part of a complete block system, making it easy to introduce the device tentatively and gradually. This is claimed as one of its special advantages. It is found that its working is readily understood by track foremen, and that its daily inspection can safely be left with them, so that one skilled man can readily supervise 100 miles, instead of about 13 miles only with electric block signals.

Referring to the view of a "primary bellows" in fig. 1, the weight of the locomotive presses down the gently sloping lever lying close to the rail, thus rotating the shaft running out to the bellows-house, and raising a long arm attached thereto seen near the floor. This communicates rotation to the ratcheted quadrant seen below the bellows, and also to a wiper-cam which compresses the springs under the bellows. A suitable pawl engages with the quadrant so as to retain this compression in the springs, and these latter by their pressure against the bellows produce the desired current of air.

Ingenious attachments release the quadrant or sector when the bellows have collapsed to a certain fixed point, regardless of the throw of the actuating lever, protect the minor parts from shock, insure the release of the lever and springs and the complete refilling of the bellows, and delay the escape of the air from the bellows so that the track lever shall remain down until the entire train has passed.

The current of air thus set in motion passes through the small  $\frac{3}{8}$ -in. pipe already referred to, and acts upon a small diaphragm-covered cup, seen in the front of the gong-striking mechanism, fig. 3. The current of air entering the cup from the base expands the diaphragm and raises a trip, which permits the signal machinery to move, or which stops its motion. The machinery thus set in motion differs according to the purpose for which it is designed, whether to ring a bell or move a semaphore arm, or lower a gate or sign; but whatever its nature, the same kind of diaphragm is everywhere used to start and stop it pneumatically.

Having performed this act, the function of the pneumatic apparatus, properly so called, is complete, since any kind of signals actuated by any kind of power may be connected to this trip. The method of actuating the signals used and preferred by the company, in order to preserve the automatic character of the whole apparatus, is shown at the base of the

gong, fig. 2. Track levers and a connecting shaft are there shown, of the same nature as in fig. 1, which serve not only to stop the signal (in this case without the intervention of pneumatic apparatus) but to accumulate power to actuate the signal when next set in action. This is done by permitting each wheel of the train as it passes to press down the track levers (instead of the locomotive only doing so, as with the bellows) each motion lifting a ratchet pawl against the pressure of a spring, which latter causes the pawl to drive a ratchet wheel which winds up a spring. Suitable attachments prevent undue shock and automatically throw the ratchet out of gear when the spring is completely wound up. Whether to ring a gong only, as in fig. 2, or to display a warning sign or drop a gate across the track, as in fig. 4, an

used is found sufficiently large for any probable distance between signals. The system employed and recommended by the company as best adapted to the requirements of its signals is shown in figs. 4 and 5.

Suppose a train entering upon the middle block *C* of fig. 4 (for a double track), within which block occurs a grade crossing, *G*. At the beginning of the block a bellows, *b*, is placed, and another, *g*, at the other end of the block. Near *b* is erected a signal post provided with a semaphore disc or target and lantern operated by the bellows *b*.

As the pilot wheel of the engine depresses the levers beside the rail, the bellows are caused to collapse by the action of the rotary levers and connecting parts, and to force air from the bellows through the pipe represented by dotted lines into the diaphragm cups. This causes the diaphragm to set to danger the semaphore *a* before the eyes of the engineer, thus guarding the rear of the block, and releases to safety the signal *h* in the rear, thus opening block *B*. The engineer knows that the signals are acting properly by seeing them change to danger as he enters the block.

On block *D* ahead is another train which has just set the signal *d* to danger behind it, closing the block, and has also in this case set a special danger signal ahead, *f*, at the other side of the tunnel or draw, this being in such cases a desirable protection, although ordinarily the block needs to be closed only from behind. The regular block signal *f* still remains at safety until the engine at *D* passes it, provided there be no train on the block.

Returning to the rear block, as the engine passes *b*, if there happen to be a grade crossing *G* on the block, with its accompanying gong-post *c*, the gong-striking apparatus is released and a gate or sign is lowered by the same impulse of the bellows *b*, which thus actuates three signals at once.

When the train reaches the end of the block at *d*, it depresses the levers of bellows *g* and restores to safety signal *a*, setting to danger signal *f* ahead.

Any arrangement of block signals necessarily involves more complication for a single-track than for a double-track road. That devised by this company for a single track is as follows:

Fig. 5 shows three blocks provided with signals on both sides. The engineman is instructed that he may enter a block only when the signal on his right is at safety when he reaches it, and turns to danger, as he passes it; and he also knows that the two signals, *c* and *f* on the left, should be at danger as he passes. When his engine arrives at the end of the first block, it sets to danger the signal *a* on his right and *e* and *d* on his left, and restores to safety in his rear signals *f*, *c* and *h*.

In this way, at each successive block the engine continues to set ahead to danger one signal on its right and two on its left, and to release to safety in its rear one on its right and two on its left, making six signals operated at once, for the block system, in addition to any crossing signals on the block. All the signals are self-locked in the rear and cannot be again moved until the train is out of the section.

The purpose of these intermediate signal posts *g*, *b*, *l*, *o*, *e* and *c*, is as a protection against the chance that trains going in opposite directions might happen to pass over the levers at opposite ends of the same block, as at *h* and *a*, fig. 5, at the same time, or nearly so. In this case the engineer of each train would imagine that his own engine, instead of an opposing one, had set the signal to danger, but by means of the intermediate posts (not necessarily just opposite to each other) an ample warning of danger is given to each.

It will be seen, therefore, that any breakage in a primary

Fig. 4.—Double Track.

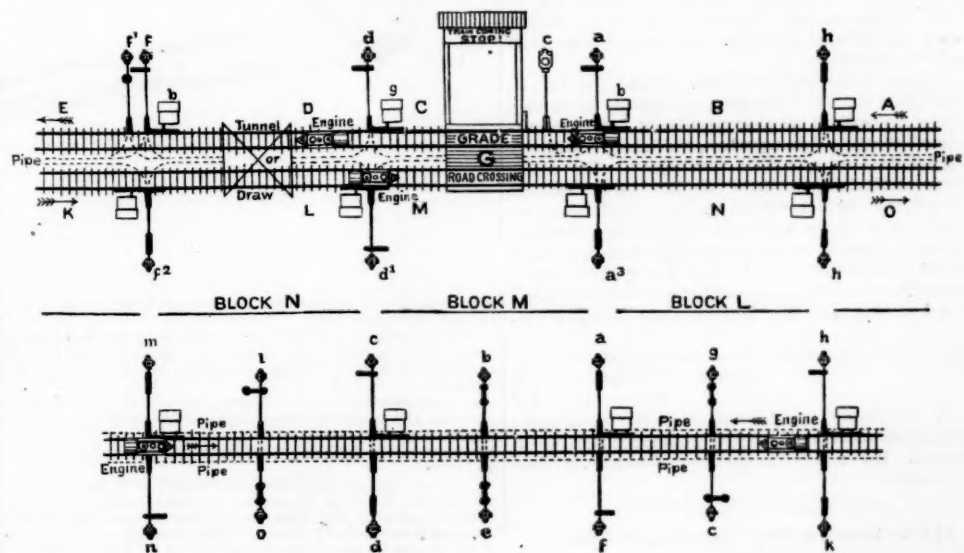


Fig. 5.—Single Track.

DIAGRAMS SHOWING DISPOSITION OF SIGNALS.

ample supply of power may be obtained in the manner described.

The application of the system to block signaling may be varied in almost any way desired as respects length of blocks and number and disposition of signals. The small  $\frac{3}{8}$ -in. pipe

bellows, perhaps the most likely place for breakage to occur, reveals itself at once to the next train, but neither that nor a breakage of signal mechanism can ever occur so as to leave a train unprotected from the rear. A single remote possibility of trouble can be imagined on the single-track system, which



can be avoided if desired by adding another intermediate signal. Owing to the simplicity of the apparatus in its normal form duplications of this kind are easy. For these and other reasons it is claimed that, practically, the apparatus is as trustworthy as others more elaborate, while far less troublesome and expensive. As a crossing signal alone there is a wide field for the application for an apparatus working as well as this is represented to have done.

#### Barnhart's Steam Shovel and Wrecking Car.

The machine illustrated, manufactured by the Marion Steam Shovel Co., of Marion, O., is one in which a special effort has been made to obtain simplicity of the working parts. It is claimed, however, to be able to load from 2,000 to 3,000 cubic yards per day of earth or gravel upon the cars with a consumption of half a ton of coal, and to have a capacity of 20 tons for wrecking purposes, so that its capacity is ample for ordinary requirements.

The crew consists of three men, engineer, fireman and dipper-tender. The car is self-propelling in either direction, at a fair rate of speed, by the usual device of pitch gear connected to the trucks.

The car frame is of iron exclusively, of the usual channel-bar and I-beam sections. The trucks are built to the Master Car-Builders' standards, so far as they have been established.

The mast is solid wrought-iron, 6 in. in diameter and 11 ft. high. It sets in a cast base, the upper surface of which forms a journal for the crane and turn-table to revolve on. The top of the mast carries the mast head, through which the hoisting chain passes between two horizontal sheaves which steady the chain while swinging from side to side and prevent it from being twisted, which is found to save much friction and wear to chain. The mast is well braced; two stays being carried the from top of the head to the lower rear end of the car, adjusted by large nuts, and two down to the jack-brackets at the side of the car.

The jacks are made of cast steel and work on a hinge, so as to swing back alongside to pass obstructions, or when on the road, and they are easily taken off for shipping. They have a 3½-in. screw working in a cast steel nut, which fits in a socket in the outer end of the jack-arm. The latter extends 4 ft. from the side of the car, thus giving great leverage and firm support to the car while working.

The track is made of ordinary iron or steel rails, 5 ft. long, held in position by chairs furnished with the machine, which are spiked to ordinary ties, requiring but one under each joint.

The crane is made of the best of yellow pine, the top and lower edges bound with iron. When ready for work it is 20 ft. long and 20 ft. high at the outer end. It works on a hinge at the turn-table for convenience in raising and lowering. The outer end is supported by a 2-in. rod secured to the mast by a clevis, and to the boom by a cast-steel yoke which contains a spiral spring to relieve sudden jars, which is found to greatly reduce the danger of breakage. Links are provided at one end of this rod for adjusting it to any length desired.

The dipper has, usually, a capacity of 1½ cubic yards, and is made entirely of steel. It is provided along the lower inside edge with a set of wrought-iron teeth forged out of 4×4-in. iron, pointed with steel. The bail is made of 2×5-in. iron. The dipper-handle is 11 ft. long, and is provided with a set of cast-steel racking in which operate two cast steel pinions to thrust the dipper into the bank. All shafting on the crane is 3 and 3½-in. in diameter. The power to operate the dipper-gear is obtained from the end of the crane by a square-linked malleable-iron chain made for that purpose, and is applied when wanted by a friction clutch.

The turn-table is 8 ft. in diameter, made entirely of wrought iron, and is operated by a ¾-in. cable chain, each end of which is fastened to a friction swinging drum, on each side of the turn-table, serving to take up the slack of the chain, the centre of the chain being secured to the front centre of the turn-table.

The engines are vertical, 8 × 10-in. cylinders, and set on same bed-plate with the drum-shaft, thus making all working parts rigid. The whole machinery consists of but one drum-shaft provided with a 4-ft. cog-wheel, which is driven directly from the engine-shaft by a 10-in. steel pinion. The engine and drum-shafts always rotate in one direction at a uniform speed regulated by a governor, the drum-shaft being provided with three friction-drums, one on each side of the hoisting drum, to swing the crane in any direction desired, all controlled and operated by one lever. The hoisting drum is in the centre and on the same shaft, and is operated by one lever and a foot-brake. The hoisting chain is made of 1-in. iron.

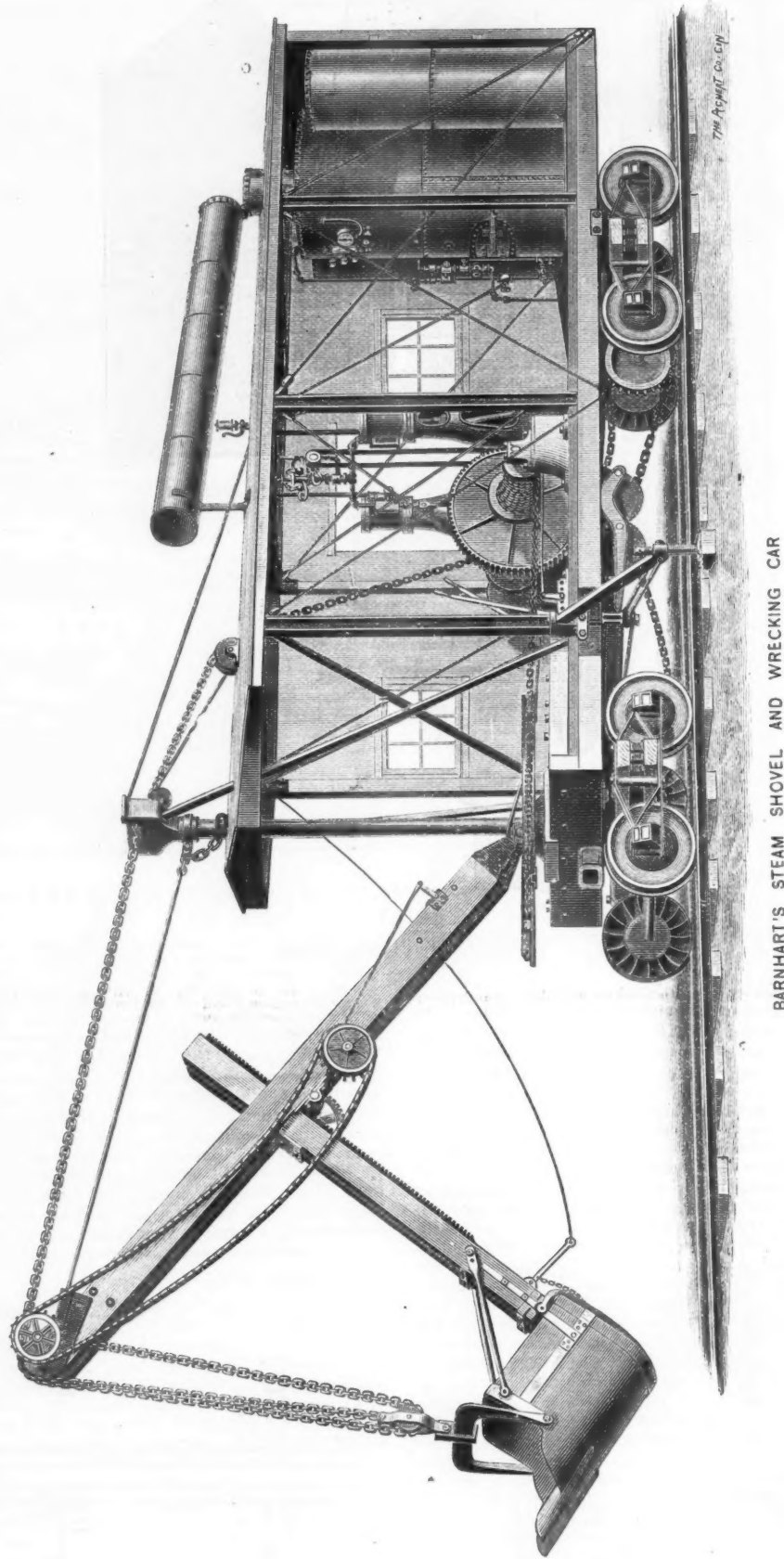
The boiler is an upright submerged flue-boiler, 4 ft. in diameter and 8 ft. high, containing 100 2-inch flues. It has an arched fire-box flue-sheet, and the flues are copper-feruled. The water supply is carried in two water tanks, located one on each side of the boiler, connected by a pipe at the bottom. Water is fed to the boilers with a No. 20 Hancock inspirator.

#### The Baltimore & Ohio Technological School.

President Garrett's general order in relation to the establishment of a school of technology in connection with the shops of the Baltimore & Ohio Railroad Co. is as follows, bearing date Jan. 15, 1885:

The inauguration of a Baltimore & Ohio technological school for the promotion of a higher course of instruction for the apprentices of this service than that now pursued, with headquarters at Mt. Clare, Baltimore, and conducted under the superintendence of a board of seven directors, appointed annually by the President of this company, is announced.

Messrs. John K. Cowen, E. J. D. Cross, Dr. Charles M. Cresson, Andrew Anderson, Dr. W. T. Barnard, Bradford Dun-



BARNHART'S STEAM SHOVEL AND WRECKING CAR

ham and Charles Selden are hereby appointed directors for the calendar year 1885.

The course and method of instruction in its several departments and the operations of the technological school shall be governed by regulations prescribed by its board of directors.

In furtherance of the objects for which this school is founded, and to secure uniformity and discrimination in the employment of apprentices in all departments, the General Manager will promulgate rules regulating their appointment and service.

In the establishment of a technological school the company affords the youth in its employ opportunities for obtaining a liberal technical education far superior to those enjoyed by the employes of other railroads. The examinations prescribed in the course of the technological school will be very thorough, and will require from the apprentice a close and persevering attention to study, without evasion or slighting of any part of the course, as no relaxation of any kind can be made by the board of examiners; and, as the company will hereafter endeavor to advance the graduates of the technological school to positions of responsibility and trust in its service, only those who demonstrate willingness and ability to qualify themselves for advancement will be retained.

The General Manager will convene a board of examiners consisting jointly of two medical examiners of the relief association and three instructors of the technological school, whose duty it shall be to examine and classify all apprentices now in service, in accordance with the standard of qualifica-

tions prescribed in his general order on the subject. This board will visit each station where apprentices are employed and finally report, in writing, to the General Manager, the result of their labors.

In accordance with these orders the following regulations have been prepared for the new school, and are issued by General Manager Dunham:

#### SECTION I.

1. On and after this date all apprentices will be embraced under the following general designations, and graded into three classes, viz.:

First (junior) class, B. & O. apprentices; second class, B. & O. cadets; third (senior) class, B. & O. cadet officers.

2. The term of service in the several classes will be: First class, four years; second class, three years; third class, three years.

3. As the Baltimore & Ohio Railroad Co. undertakes the expense of educating apprentices and cadets passing the physical and educational examinations, it will expect the privilege of availing of the services of such as are competent for its purposes, at fair salaries, for at least three years after graduation.

4. Apprentices and cadets will be amenable to the discipline and regulations of the company, and violation of its rules, neglect of its interests, destruction of its tools or waste of its property will be cause for dismissal. But, while liable to suspension by their immediate official superiors, apprentices and cadets cannot be dismissed except by the direc-



ferred stock. The funded debt consists of \$418,000 first 7s \$387,500 second 7s; \$1,497,000 consolidated 5s, and \$118,895 interest scrip.

The earnings for the year were :

	1884.	1883.	Decrease.	P.c.
Earnings.....	\$333,560	\$424,495	\$90,935	21.4
Expenses.....	157,836	203,444	45,608	22.4

Net earnings.....	\$175,724	\$221,051	\$45,327	20.5
Gross earn. per mile....	5.212	6.633	1.421	21.4
Net " " " " .....	2.747	3.454	.708	20.5
Per cent. of exps.....	47.3	47.9	0.6	...

Interest on the funded debt amounts to \$138,018. This would leave a surplus of \$37,706, equal to 1.9 per cent. on the preferred stock. The decrease was entirely due to the diminished coal and iron ore traffic.

**Chicago, Milwaukee & St. Paul.**

This company has made its usual preliminary statement for the year ending Dec. 31, from which the figures below are taken.

The earnings for the year were:				
	1884.	1883.	Inc. or Dec.	P. c.
Earnings.....	\$23,470,908	\$23,659,824	D. \$188,826	0.8
Expenses .....	13,859,629	13,778,037	I. 81,592	0.6

Net earnings...	\$9,611,360	\$9,881,787	D.	\$270,418	2.7
Gross earn. per mile.....	4,912	5,201	D.	289	5.5
Net earn. per mile.....	2,012	2,172	D.	160	7.3
Per cent. of exps.	59.05	58.23	I.	0.82	

The company opened less new road last year than in any year for a long time past.

The income account is as follows:

Net earnings, as above .....	\$9,611,369
Other income .....	82,306

Other income.....	85,000
Total .....	\$9,693,675
Interest charges.....	\$5,918,608
Dividends, 7 per cent. on all stock.....	3,321,167
	<u>9,239,775</u>

Surplus for the year.....	\$453,900
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For 1989, the surplus, after paying dividends, was \$1,450.

For 1883, the surplus, after paying dividends, was \$1,450,672. The decrease in gross earnings is lighter than generally estimated. The falling off in surplus is due to three causes, a decrease of \$270,416 in net earnings, an increase of \$544,683 in interest, and of \$108,272 in dividend payments.

**Cheshire.**

This company owns a line from Bellows Falls, Vt., across New Hampshire to South Ashburnham, Mass., 53 $\frac{1}{2}$  miles, and leases the use of the Fitchburg Railroad tracks from South Ashburnham to Boston, 104 $\frac{1}{2}$  miles. It also owns

South Ashburnham to Fitchburg, 10½ miles. It also leases the Monadnock Railroad, from Peterboro, N. H., to Windchendon, Mass., 16 miles, making 80 miles worked. The report is for the year ending Sept. 30.

The company has \$53,300 common stock and \$2,100,000 preferred stock. It has also \$800,000 outstanding 6 per cent. bonds.

	1883-84.	1882-83.	Inc. or Dec.	P. c.
Train-miles .....	542,471	568,077	D. 25,606	4.5

Passengers carried..	161,373	165,826	D.	4,453	2.7
Passenger-miles ....	4,908,216	5,248,268	D.	340,042	6.5
Tons freight carried	523,588	555,163	D.	31,375	5.7
Ton-miles.....	28,970,669	30,552,986	D.	1,562,317	5.1

Average rate:				
Per passenger-mile..	3.14 cts.	3.05 cts.	I.	0.09 ct.
Per ton-mile ....	1.28 "	1.34 "	D.	0.06 "

The freight business is almost entirely through freight.  
The earnings for the year were as follows :

	1883-84	1882-83	Inc. or Dec.	P. c.
Earnings	\$2589 985	\$2924 594	D. 334 609	11.26

Earnings .....	\$586,685	\$634,524	D.	\$47,839	7.5
Expenses .....	405,909	473,438	D.	67,529	14.2
Net earnings .....	\$180,776	\$261,086	I.	\$80,310	44.4

Net earnings.....	\$180,776	\$161,086	I.	\$19,690	12.2
Gross earn. per mile.....	7,334	7,932	D.	598	7.5
Net " " " ".....	2,260	2,014	I.	246	12.2
Per cent. of exps. ....	60.2	74.6	D.	5.4	...

From the net earnings last year the payments made were \$57,666 for rentals and \$48,000 for interest on bonds, leaving a surplus of \$75,110. From this surplus dividends of \$1.00 per share were paid.

3 per cent. on the preferred stock were paid, amounting to \$63,000, and leaving a balance of \$12,110 to profit and loss.

**Brunswick & Western.**

**Brunswick & Western.**

This company owns a line from Brunswick, Ga., west to Albany, 171 miles. The statements below have been published for the year ending Dec. 31.

The company has \$1,500,000 common and \$3,500,000 preferred stock; the funded debt consists of \$2,000,000 first-mortgage 6 per cent. bonds.

The earnings for the year were as follows :

	1884.	1883.	Inc. or Dec.	P. c.
Earnings . . . . .	\$308,098	\$338,824	D. \$30,726	9.1
Expenses.....	288,334	230,849	I. 57,485	24.9

Net earnings.....	\$10,764	\$107,975	D. \$88,211	81.7
Gross earn. per mile...	1,802	1,981	D. 179	9.1
Net earn. per mile....	116	631	D. 515	81.7
Per cent. of exps.....	93.6	68.1	I. 25.5	...

The net earnings last year were less than 1 per cent, on the bonds. The decrease in earnings was due partly to a falling off in lumber shipments, but chiefly to the reduction in rates made by the Railroad Commission of the state.

## Delaware &amp; Hudson Canal Co.

The preliminary report of this company for the year ending Dec. 31 shows that the capital stock is now \$23,500,000. This is an increase of \$3,500,000, the new stock having been issued to retire an equal amount of bonds.

	1882.	1883.	1884.
Gross receipts	\$15,573.926	\$17,842.499	\$16,379.021

Gross receipts.....	\$13,573,925	\$17,852,450	\$16,578,021
Expenses.....	10,422,325	12,450,190	11,549,871
Net.....	\$5,151,602	\$5,336,325	\$4,829,140
Less taxes, interest and rentals.....	3,313,401	3,390,472	3,341,053
Balance.....	\$1,838,201	\$1,965,843	\$1,488,094
Per cent. on stock.....	9.20	9.97	6.83

Last year the company mined 3,302,680 tons of coal and carried 623,697 tons for other parties. The statement says: "The mining of coal was suspended for 103 days during the year. Under the policy of restriction the surplus or dividend fund has steadily increased, notwithstanding the payment for several years of dividends of 6 and 7 per cent. per annum. This policy has been again adopted by the authoritative interests, although the method of carrying it into effect has been changed. It is believed that this method, known as the per centum or allotment plan, will show decided advantages in the economies of mining."





Published Every Friday.

## EDITORIAL ANNOUNCEMENTS.

**Passes.**—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

## AMERICAN WHEAT PRODUCTION.

The estimates of the area and production of the crops of the year are given by the December report of the Department of Agriculture, recently issued. The final figures of area are especially valuable for establishing the progress of agriculture.

For wheat the acreage reported differs greatly from the estimate early in the season, which made the area of winter-wheat sown about the same as that of 1883, but the area harvested about 1,000,000 acres greater (that amount having been winter-killed and abandoned in 1883), and reported an increase of about 1,000,000 acres in spring-wheat. The final estimate makes the total area harvested last year 3,020,000 acres more than in 1883. The acreage and production for the last six years, by the Department's final estimates, have been:

Year.	Acres.	Bushels.	Year.	Acres.	Bushels.
1879	35,430,300	459,500,000	1882	37,067,200	504,200,000
1880	37,986,700	498,500,000	1883	36,455,600	421,100,000
1881	37,709,000	380,300,000	1884	39,475,855	512,763,900

Thus the area harvested last year, though 8 per cent. more than in 1883, was less than 4 per cent. more than in 1880, four years before; and the production, though 21 per cent. more than in 1883, was but 1.7 per cent. more than in 1882, and not 3 per cent. more than in 1880. It is evident, therefore, that the current extremely low prices are not caused by the increase in production in the country. Our own population since 1880 has increased about 6½ millions, and the supply of this increase requires more than 29 million bushels of wheat, or twice our increase in production, so that the surplus available for export and for seed is about 10 per cent. less now than from the crops in 1880. Of course the available supply of the world fixes the price, and this depends not only on our and foreign crops at the time, but on the surplus remaining from previous years, which was great last year outside of this country.

An examination of the areas in the different states and groups of states shows very slight changes from 1883 to 1884 in the whole East and South—east of the state of Ohio, south of the Ohio River, of Missouri and Kansas—in which great area there were:

Acres.	1884.	1883.	Increase.	P. c.
	9,752,080	9,682,504	70,176	0.7

In the four winter-wheat states east of the Mississippi—Ohio, Michigan, Indiana and Illinois—there were:

Acres.	1884.	1883.	Increase.	P. c.
	9,905,217	8,325,270	666,947	7.9

There was probably no increase at all in the area sown here, and possibly a decrease, as it is here that occurred the great losses by winter-killing in 1883. More than seven-eighths of the increase was in Illinois alone, where the area was much less than in some previous years. This group of four states, which still has more than one-fourth of the total

wheat acreage of the United States, has been reducing its acreage of this crop ever since 1880, the acres harvested for six years having been:

1879.	1880.	1881.	1882.	1883.	1884.
10,217,120	11,408,047	11,040,700	10,580,000	9,325,270	9,905,217

As we have said, there was no increase of area sown last year, and the area harvested then was 12½ per cent. less than in 1880.

Of the other two winter-wheat states in the Mississippi Valley only Kansas has increased its acreage, Missouri having a smaller area last year than in any other since 1881, though its decrease is small. In Kansas, however, the increase over 1883 is given as 38 per cent. It is the only winter-wheat state this side of the Pacific coast where there has been any tendency to increase acreage for several years past, and taking the winter wheat country of this coast altogether, the acreage has decreased materially since 1880 and 1881.

In the spring-wheat states, which are few in number, there has been a very great increase in the newer ones, that is, in Nebraska and Dakota, but a decided decrease in the older ones, though two of these gained in 1884. The wheat acreage of each of these spring-wheat states has been, for six years:

1879.	Wis.	Minn.	Dakota.	Iowa.	Neb.
1879	1,948,160	3,044,670	265,298	3,049,288	1,469,865
1880	1,753,130	3,060,280	360,000	3,190,212	1,520,315
1881	1,595,300	3,152,100	500,000	2,775,500	1,958,500
1882	1,610,000	2,547,000	720,000	2,485,000	1,657,000
1883	1,593,900	2,597,940	1,008,000	2,435,300	1,772,990
1884	1,434,510	2,753,816	1,540,200	2,605,771	1,950,280

The aggregate wheat acreage of these states has been:

1879.	1880.	1881.	1882.	1883.	1884.
9,777,281	9,883,937	9,981,400	9,019,000	9,408,130	10,284,577

Thus in spite of the development of Dakota as a leading wheat-growing district in this time, there was not till this year any increase over the spring-wheat acreage of 1879, Wisconsin, Iowa and even Minnesota having been growing less and less, though Iowa and Minnesota have meanwhile very greatly increased their total area of cultivated land, and the new lands occupied in Minnesota have been very largely in the very best wheat country in the state, and where actually little else is raised. The conclusion, therefore, is inevitable, that wherever the spring-wheat country has been long settled, there has been a very great reduction of the area devoted to that grain. Compared with 1879, the percentages of increase over decrease in these several states have been:

Wisconsin.	Iowa.	Minnesota.	Nebraska.	Dakota.
Decrease.	Decrease.	Decrease.	Increase.	Increase.
26.3 p. c.	14.5 p. c.	9.6 p. c.	32.7 p. c.	44.3 p. c.

Thus in the great wheat country of the upper Mississippi Valley we find very little of the increase of 4,000,000 acres of wheat which there has been since 1879, and none of the 1,500,000 since 1880. The acreage there, in six winter-wheat and five spring-wheat states, has been:

1879.	1880.	1881.	1882.	1883.	1884.
23,958,200	25,541,800	25,602,800	23,507,000	22,626,100	24,735,000

They had 67.6 per cent. of the whole United States wheat acreage in 1879 and 1881, but only 62.6 per cent. last year. We must look for what gain there has been elsewhere.

The only other part of the country where there is a large production is on the Pacific Coast, where the acreage for six years has been:

Year.	California.	Oregon.	Washington.	Total.
1879	1,832,429	445,077	81,554	2,359,060
1880	2,117,350	690,200	100,000	2,907,550
1881	2,367,200	738,600	120,000	3,225,800
1882	2,767,000	723,000	148,000	3,638,000
1883	2,794,600	795,300	170,200	3,759,500
1884	3,360,000	858,924	326,366	4,545,290

Here we find constant and rapid gains everywhere. California, which in 1879 stood eighth among the states in wheat acreage, with nearly the same as Michigan and Kansas, and less than Wisconsin, last year stood first, with a long interval between it and the second state, Illinois, and more than twice as much as Wisconsin. Its increase since 1879 is 83½ per cent., which is much more remarkable than the gains of 93 per cent. in Oregon and 300 per cent. in Washington, because a large part of the wheat lands of the latter have been made accessible since 1879. We find on the Pacific coast 2,183,000 of the total 4,000,000 acres increase since 1879, and 1,638,000 acres gain since 1880, against a total gain of but 1,488,000 acres.

The acreage of the three states in the Mississippi Valley—Kansas, Nebraska and Dakota—that have gained has been:

1879.	1880.	1881.	1882.	1883.	1884.
3,597,235	3,913,915	4,656,500	3,950,000	4,315,340	5,610,980

The gain since 1879 is a little less than on the Pacific coast. Taking these states and the Pacific coast together, we have their aggregate acreage as follows:

1879.	1880.	1881.	1882.	1883.	1884.
5,956,295	6,821,525	7,882,300	7,588,000	8,074,840	10,156,270

And this leaves for all the rest of the country:

1879.	1880.	1881.	1882.	1883.	1884.
20,474,005	31,165,175	29,820,700	20,470,200	28,380,760	29,319,535

Thus the wheat area in the older states—in the whole country except four states and two territories—has been remarkably steady in all this time. Allowing for

the million acres winter-killed and ploughed up in 1883, the variations have been insignificant except in 1880, when the large and profitable crops of three previous years had stimulated wheat-growing. The decrease in the older Mississippi Valley states has been balanced chiefly by an increase in the South, which does not grow much wheat now, but grows much more than in 1879—6,473,000 acres in 1884 against 5,701,000 in 1879, having varied but little for the last three years.

It seems thus that only in a very small part of the country is there any tendency to increase wheat-growing, while in what is still the most important part of the wheat country, the tendency is in the other direction. The seven upper Mississippi Valley states which have heretofore decreased their production had 16,790,000 acres last year, and a reduction of 10 per cent. there, which is entirely possible, would bring the wheat acreage of the country below that of 1880, even should there be no decrease elsewhere, as there is likely to be wherever other crops are largely raised, as in nearly the whole country except Dakota and on the Pacific coast.

We have purposely avoided giving the production above, as the season varies so that it might give a very erroneous view of the course of the wheat-growing industry—would not show where it is increasing and where decreasing. The production, however, is most interesting as indicating the immediate effect on traffic.

In the North Atlantic states—Maryland, Pennsylvania and further north and east—the production has been for eight years in millions of bushels:

1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
42.2	47.4	43.4	48.3	41.0	45.5	39.9	40.1

Thus the changes have been inconsiderable.

If we take the South as a whole we shall find the production in proportion to area inconsiderable, but there is a belt between the Northern states and the cotton states which has a considerable production; in these states—Virginia, North Carolina, West Virginia, Kentucky and Tennessee—the production has been, in millions of bushels:

1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
35.7	23.6	33.9	36.8	31.2	46.0	33.9	38.2

Neither has there been any great change here, taking the period as a whole.

In the rest of the South, which we may call the "cotton states," the production has been:

1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
10.6	16.6	10.6	11.5	10.5	12.9	21.9	22.1

Here we find the production was much greater in the last two years than ever before, but it was still very small—not one half that of some single states.

We will take next the five older winter-wheat states of the upper Mississippi Valley—all of them but Kansas—where the production has been:

1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
125.5	145.9	204.9	223.4	138.2	201.1	125.3	164.6

Here we see was a great part of the growth of wheat production down to 1880. It began, however, one year earlier, the production of 1876 having been but 96.2 million bushels. From 1876 to 1880 there was an increase in these five old winter-wheat states of 127.2 million bushels, or 132 per cent., the increase in all the rest of the country having been 82 millions, or 42½ per cent.

But since 1880 there has been a great decrease in the production of these states, and last year, with a pretty good crop, they had 26½ per cent. less than in 1880, and 18 per cent. less than in 1882. Meanwhile Kansas, the new winter-wheat state, has progressed in this fashion:

1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
14.4	27.2	17.3	20.3	19.9	31.2	26.9	35.0

Thus gaining since 1880 75 per cent., which, however, is but just one-fourth of the loss of the five older states.

We now take up the spring-wheat states, whose production we give for each separately:

Year.	Wis.	Iowa.	Minn.	Neb.	Dak.	Total.
1876	16.8	17.6	16.0	4.3	1.0	55.7
1877	22.0	37.8	33.3	5.6	1.5	100.2
1878	21.2	30.4	28.8	13.9	2.0	96.3
1879	24.9	31.2	34.6	13.8	2.8	107.3
1880	16.7	33.2	40.4	12.9	5.6	108.8
1881	18.0	18.2	40.0	13.8	8.0	98.0
1882	23.1	25.5	33.0	18.3	11.5	111.4
1883	19.6	27.5	33.8	27.5	16.1	124.5
1884	20.1	31.3	41.3	28.3	22.3	143.3

Here we encounter the movement in opposite directions which we found in discussing the acreage. The older states do not increase their production, though it is noticeable that they have maintained it very well in spite of the reduction in area, but the whole of the gain since 1877 has been in Nebraska and Dakota, which produced 7,100,000 bushels then, and 50,600,000 last year. The larger production in Minnesota last year is in spite of a considerable decrease in area, and due to the cultivation of the new lands in the Red River Valley, which produce much above the average yield of the state. The three states that have made a posi-



## TRAIN ACCIDENTS—THEIR NATURE AND CAUSES FOR TWELVE YEARS.

	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
<b>COLLISIONS:</b>											
Rear .....	187	131	141	159	142	206	274	306	388	413	280
Butting .....	102	87	104	94	70	86	141	146	160	177	138
Crossing .....	31	19	18	15	13	17	22	24	30	39	27
Unknown .....	72	53	15	11	1	1	1	1	1	1	1
Passing .....	1	1	1	1	1	1	1	1	1	1	1
Total collisions .....	392	260	278	279	268	310	437	536	581	630	445
<b>DERAILMENTS:</b>											
Broken rail .....	111	42	107	50	46	56	45	85	37	84	60
Loose or spread rail .....	13	16	40	43	29	19	21	29	29	88	68
Broken bridge or trestle .....	19	31	29	20	21	17	16	44	38	35	34
Broken or defective switch .....	10	12	15	4	1	2	5	5	2	2	9
Broken or defective joint .....	3	5	10	2	2	2	2	2	3	1	9
Broken or defective frog .....	4	8	8	3	2	2	2	2	4	7	11
Bad track .....	7	13	4	4	4	4	4	4	4	4	4
Total defects of road .....	167	129	206	125	118	72	94	109	156	227	182
Broken wheel .....	26	20	33	22	12	21	21	58	33	40	22
Broken axle .....	21	20	39	38	18	30	30	50	52	60	30
Broken truck .....	7	8	15	8	13	11	13	10	14	24	12
Failure of coupling or draw-bar .....	8	7	3	1	4	2	2	1	1	2	3
Broken parallel or connecting rod .....	9	5	5	5	1	1	1	1	1	1	3
Broken car .....	2	4	3	2	1	1	1	1	1	1	3
Loose wheel .....	4	2	4	3	4	2	2	1	1	1	3
Fall of brake or brake-beam .....	9	4	4	3	4	4	4	4	4	4	4
Broken tire .....	1	1	1	1	1	1	1	1	1	1	1
Total defects of equipment .....	73	63	100	76	66	41	66	64	102	129	67
Misplaced switch .....	16	7	8	7	5	7	8	8	9	8	8
Rail (or bridge) removed for repairs .....	1	1	1	1	1	1	1	1	1	1	1
Making flying-switch .....	6	1	1	1	1	1	1	1	1	1	1
Runaway engine or train .....	4	1	3	1	1	1	1	1	1	1	1
Running through siding .....	3	3	3	3	3	3	3	3	3	3	3
Open draw .....	4	2	2	2	2	2	2	2	2	2	2
Careless stopping and starting .....	3	3	3	3	3	3	3	3	3	3	3
Overloading car .....	2	2	2	2	2	2	2	2	2	2	2
Bad switching .....	2	2	2	2	2	2	2	2	2	2	2
Total negligence in operating .....	101	93	100	108	85	65	90	98	104	112	94
Cattle on track .....	54	45	51	46	30	35	43	42	48	45	28
Snow or ice .....	9	13	10	16	13	22	8	15	15	5	7
Wash-out .....	30	10	14	40	36	11	17	17	23	25	25
Land slide .....	11	11	11	11	11	7	4	4	7	16	18
Accidental obstruction .....	44	51	37	36	26	24	25	45	37	53	42
Malicious obstructions .....	11	22	21	11	11	11	8	13	17	12	12
Wind .....	2	7	7	2	2	3	3	3	5	19	3
Man on track .....	2	2	2	2	2	2	2	2	2	2	2
Flood over track .....	2	2	2	2	2	2	2	2	2	2	2
Rail or switch purposely misplaced .....	2	2	2	2	2	2	2	2	2	2	2
Total unforeseen obstructions .....	152	141	207	160	131	125	113	108	144	199	152
Others (1 each) .....	7	10	5	1	3	2	1	1	1	1	1
Unexplained .....	315	218	222	185	177	192	237	310	238	259	180
Total derailments .....	815	655	840	655	581	481	557	597	742	926	681
<b>ACCIDENTS WITHOUT COLLISION OR DERAILMENT:</b>											
Boiler explosions .....	16	14	28	19	15	11	17	14	12	13	16
Cylinder explosions .....	3	6	3	3	1	1	3	1	1	5	2
Broken parallel or connecting rod .....	11	8	14	7	13	1	13	1	11	26	17
Broken axle .....	2	13	13	11	13	1	13	1	13	13	13
Cars burned while running .....	2	10	16	11	11	13	6	8	7	13	13
Broken wheel .....	10	16	16	11	11	13	6	8	7	13	13
Broken tire .....	10	16	16	11	11	13	6	8	7	13	13
Other breakages of rolling stock .....	19	18	8	8	1	3	3	1	1	1	1
Failure of bridge or trestle .....	2	2	2	2	2	2	2	2	2	2	2
Mass falling on running train .....	2	2	2	2	2	2	2	2	2	2	2
Accidental obstruction .....	11	11	11	11	11	11	11	11	11	11	11
Malicious obstruction .....	3	3	3	3	3	3	3	3	3	3	3
Other causes .....	9	9	9	9	9	9	9	9	9	9	9
Total without collision or derailment .....	76	66	83	48	42	39	43	44	42	84	65

## RECAPITULATION.

	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
Collisions .....	392	260	278	279	268	310	437	536	581	630	445
Derailments .....	815	655	840	655	581	481	557	597	742	926	681
Other accidents .....	76	66	83	48	42	39	43	44	42	84	65
Total .....	1,283	980	1,201	982	891	740	910	1,078	1,364	1,640	1,191

tive increase, Kansas, Nebraska and Dakota, have produced:

1877. 1878. 1879. 1880. 1881. 1882. 1883. 1884.  
21.5 43.1 33.9 38.8 41.7 61.0 70.5 85.6

Here alone and in the cotton states have we found a considerable increase of production so far.

Crossing now to the Pacific coast we find something similar:

1877. 1878. 1879. 1880. 1881. 1882. 1883. 1884.  
30.0 51.0 38.6 47.6 43.3 50.4 52.6 63.9

The fluctuations are very great here because of the peculiar climate of California, where a lack of rain sometimes reduces the crop to an extent hardly known elsewhere in the country.

Thus there are just two parts of the country where an unusual amount of traffic will be or has been afforded by last year's wheat crop, the Pacific coast and the western tier of states in the upper Mississippi Valley. The latter require more miles of transportation by rail than any other wheat-growing district in the world. They have a fifth more wheat than in 1883, two-fifths more than in 1882, and more than twice as much as in 1881 or earlier years. On the other hand, the leading wheat-growing states further east, Minnesota, Iowa, Wisconsin, Missouri, Illinois, Indiana, Michigan and Ohio, which even last year produced half of the entire national wheat crop, though they produced a fifth more last year than in 1883, had 9 per cent. less than in 1882, 18 per cent. less than in 1880, and 13 per cent. less than in 1879. Meanwhile there has been a very great increase in the railroad mileage of this territory, and the wheat traffic per mile of road must in many cases be very much less than in many other years of moderate production. It is, however, to the advantage of several of the railroads in this district that they have to carry a large part of the product of the territory west of them, where the increase in production has been large.

On the Pacific coast the grain does not have to be carried far by rail, but the ocean transportation is the greatest anywhere made by breadstuffs. To the railroads which carry the wheat to tide-water (the California wheat going to San Francisco and the Oregon and Washington wheat almost exclusively to Portland), the transportation is probably as profitable as wheat transportation is anywhere in this country, and they should receive a very important advantage from the largely increased production. Here and in Dakota the production may be expected to increase, as not much other grain is grown there, though if prices are absolutely unremunerative, there may be no gain in California. Dakota, Oregon and Washington have been growing rapidly in population, and even with no immigration hereafter they will for some time considerably increase their area of land under cultivation. But in almost all the rest of the country other crops can be substituted for wheat, and will be, if wheat is not profitable. And it has been the general tendency in most parts of the country, and especially in the West, to cultivate a smaller proportion of the land in wheat as the country grows older. It seems at first sight absurd that grain of any kind should be grown for export so far from market as Kansas, Nebraska and Dakota. But it is for most immigrants the best they can do. Corn weighs still more than wheat in proportion to value, and stock to consume corn, and so concentrate their produce of their farms, they have not the capital to command. This was formerly the case in Ohio and afterward in Illinois. Now parts of Illinois within 50 miles of Chicago, and therefore where freights have comparatively little effect, do not produce their own bread and rarely send corn to market; indeed, even in this year of a large home corn crop some Illinois farmers have imported corn from Kansas to their stock. This transformation is almost sure to

occur in Kansas and Nebraska also; it has already made great progress in the older part of Iowa. Where corn can be grown to advantage in the far West neither wheat nor corn is likely to be raised to any great extent for export; and the great grazing plains adjacent on the West are likely to afford abundant supplies of cheap cattle for these states to fatten. Naturally we should expect grain, the heavy product, to be grown nearest the consumer, and meat and dairy products on the most distant farms. Precisely the contrary is the case in new countries, but a change is made as fast as the farmers can obtain the necessary capital.

## TRAIN ACCIDENTS IN 1884.

The record of train accidents published from month to month during the past year has contained mention of 445 collisions, 681 derailments and 65 other accidents; a total of 1,191 accidents, in which 389 persons were killed and 1,760 injured.

The year was the twelfth during which we have kept this record, and the accompanying table presents in a condensed form a statement for the 12 years, the accidents being classed according to their nature and causes.

The record includes accidents to trains only, with the casualties resulting therefrom, and does not include the very large number of accidents in which persons are injured or killed at road-crossings, while walking on the track, while getting on or off trains, etc., nor that other large class in which railroad employees suffer, in coupling cars, falling from trains or any other of the many cases in which they are exposed to danger.

The record, as our readers have often been told before, is in no sense official, and does not pretend to be complete. It is chiefly compiled from newspapers, a great number of which, from all parts of the country, are carefully searched for this purpose, and the information thus gathered is supplemented from other sources whenever possible. A complete record of accidents is an impossibility, and without doubt a large number occur that we do not hear of. Accidents occurring to passenger trains, those causing loss of life or serious injury, and those resulting in any considerable derangement of train service, are pretty sure to be reported; but the almost innumerable freight-train accidents, run-offs, "tail-enders" and similar mishaps are very apt to escape the news-gatherer, especially when they are of so slight a nature that they do not delay a passenger train or necessitate a call for the wrecking car. No record could be made to include such accidents without official authority.

The number of accidents recorded in each month of the 12 years has been:

	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
Jan. ...	178	108	131	60	147	75	112	92	223	157	168
Feb. ...	133	90	211	91	56	67	88	62	149	89	184
March ...	112	86	122	109	58	49	61	65	113	99	142
April ...	101	50	89	56	69	45	51	71	63	81	106
May ...	79	59	54	64	46	59	37	45	83	94	129
June ...	60	83	61	52	49	56	61	56	73	72	91
July ...	90	64	73	79	53	54	81	78	102	92	119
Aug. ...	150	73	114	78	98	75	70	112	129	139	144
Sept. ...	106	69	116	106	87	76	78	124	114	133	108
Oct. ...	84	81	88	103	82	61	104	120	131	136	174
Nov. ...	76	82	87	96	83	68	86	145	133	125	122
Dec. ...	80	74	84	88	66	63	69	135	113	148	112

Year, 1,283 980 1,201 982 891 740 910 1,078 1,364 1,640 1,191

From this table it may be seen that the number of accidents has generally been greater in the winter months, decreasing gradually each month until July, and then rising again in August and September. The exceptions have been in the years with mild winters, and those years can at once be picked out by noting the number of accidents in December, January and February. Apart from those accidents which are due directly to the weather, there will be found in those months a much larger number of breakages of rails, wheels and axles and other similar accidents. It is not the place here to discuss the much-vexed question of the effect of extreme cold upon steel and iron. That such accidents do occur frequently in cold weather, and that they are comparatively rare at other seasons, is a fact that no experienced railroad man will deny. What proportion of such accidents is due to the direct effect of cold and what to the rigidity and lack of elasticity of a hard-frozen roadbed is a matter of opinion upon which authorities differ.

It should be remembered that during the 12 years covered by the table above the railroad mileage of the United States has increased from about 70,000 to 123,000 miles, and that an increase in the number of accidents might naturally be looked for with so great an increase of mileage. That accidents should follow the mileage in direct ratio is not, however, to be expected. While some of the conditions on a new road—its generally imperfect track and its operation by a force necessarily made up in part of inexperienced men—would lead us to look for a greater number of accidents; on the other hand the traffic on a new road is generally lighter and more easily handled, and,



except in a few cases, there are not so many crossings, junction points and other conditions tending to complicate the traffic. Where the new road is not a branch or extension of an old one, its motive power and rolling stock also are generally new, and should be in good condition.

The accidents recorded last year are divided according to their nature and the classes of trains as below:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains.....	48	251	33	332
To a passenger and a freight. 122				122
To freight trains.....	275	430	32	737
Total.....	445	681	65	1,191

This table, allowing two trains to each collision, shows accidents to a total of 1,636 trains, of which 502 (30½ per cent.) were passenger trains and 1,134 (69½ per cent.) were freight trains. For the reasons noted elsewhere, it is certain that the real proportion of passenger train accidents is very much less than here given.

The casualties caused by the different classes of accidents for six years have been:

Killed:	In collisions.	In derailments.	In other acc.	Total.
1884.....	172	192	25	389
1883.....	227	229	17	473
1882.....	177	200	3	380
1881.....	209	190	15	414
1880.....	156	143	10	315
1879.....	94	97	4	185
Injured:				
1884.....	624	1,062	74	1,760
1883.....	716	1,145	49	1,910
1882.....	578	975	35	1,588
1881.....	565	905	37	1,507
1880.....	412	714	46	1,172
1879.....	286	389	34	709

Of the 1,191 reported accidents last year, 223 caused death and 296 injury, but not death; leaving 672, or 56½ per cent. of the whole number, in which no injury to persons is recorded.

It may be said that the number of collisions causing death or injury is greater than that of derailments. No safe calculation of averages can be made in this respect, however, as a single accident may kill or injure a large number of persons. The accident which caused the largest number of casualties of any reported last year was neither a collision nor a derailment, but resulted from the explosion of dynamite on a construction train which carried a number of laborers, and in so far as the injuries were due to the explosion they are not chargeable to the train accident.

For two years past the persons killed and injured are classed as follows:

	1884.			1883.		
	Passen- gers.	Em- ployés.	Total.	Passen- gers.	Em- ployés.	Total.
Killed .....	80	300	380	132	341	473
Injured .....	1,016	744	1,760	979	931	1,910
Total.....	1,105	1,044	2,149	1,111	1,272	2,383

Under passengers are included all persons riding on the trains who are not railroad employés on duty. The number of killed and injured thus includes, in several cases, tramps who were stealing rides, and who were in positions which exposed them to special danger. Of the total number of killed last year employés constituted 77 per cent.; of the injured they formed 42 per cent., thus contributing 51½ per cent. of the whole number of casualties.

The year just closed was fortunate in that its record includes no disaster such as the accidents at Revere, at Ashabula or at Carlyon. Nevertheless, the list of killed and injured is a sufficiently formidable one, and the destruction of property resulting from these accidents was sufficiently great to make it well worth while for railroad managers to give careful thought to the question of what proportion of these accidents could have been prevented. No system could be devised that would prevent all accidents, but a very large part of those which now occur could unquestionably be prevented by more careful management, by stricter discipline, by closer inspection of road and rolling stock, as also by the more general use of safety appliances whose value is well known.

The rear collision on the Pennsylvania Railroad, at New Brunswick, N. J., last Saturday, differs from the multitude of its kind chiefly in the amount of damage it entails. The wiping out of so large an amount of property by, such a seemingly insignificant mistake, may well arrest the attention of even the careless public, and serve as a reminder of the fearfully narrow margin between security and death, even on the best of roads. For, as we understand the reports, it is not by any means impossible for a similar coincidence of adverse circumstances to happen to a passenger train as well as to a freight.

So far as we can judge from the facts given, it seems very likely that three or more individuals, the block-signalman, the rear brakeman of the forward train, the engineman of the following train, and, if the latter was running at all faster than the rule allowed, its conductor, contributed to the causes of the disaster. This ought to serve as a powerful enforcement of the

lesson which so many previous accidents have taught, that the *every-day customs* of the men should be the subject of the careful study of the division superintendent. The fact that rear collisions are not generally million-dollar affairs, but are simply items in the repair account, should not blind directors to the simple truths that superintendents, if they are really to superintend, must have time to know all their subordinates *intimately*, that in emergencies men may be expected to act up to just so high a standard as they *habitually* do, and no higher; and that however imperative a rule for emergencies is, there is no certainty of a large body of men living up to it except by systematic and periodical investigation, for the purpose of discovering beforehand exactly how well they understand it and how faithfully they really intend to follow it.

To the surprise of most people (themselves included, perhaps), the trunk line presidents, at their meeting last week, took no steps toward dissolving or even contracting their organization. A near view of chaos apparently had a sobering effect, and it was resolved not to accept Mr. Fink's resignation, but to grant him leave of absence, and to maintain the organizations in their present state, at least until the withdrawal of the Grand Trunk from the east-bound pool takes effect, April 1 next, when that particular pool may be dissolved—and may not be. The Grand Trunk's withdrawal from the west-bound pool does not take effect until Jan. 1 next, and much may happen before then, and much may be effected in this traffic by a combination without the Grand Trunk. The managers of the trunk lines feel that some central organization is a necessity, even when the competition approximates open warfare; and they begin to see the value of the records which have been kept so long, and grow much more valuable the longer they are kept, showing the course traffic has taken under the most diverse circumstances, and throwing a flood of light on what we may call the physiology and pathology of traffic—for they follow the course not only of healthy transportation, but of transportation suffering from various disorders. All these records will come very handy one of these days, when the companies, exhausted by their struggles with each other, or having attained a better frame of mind, determine to work in harmony again, but most of all the records of the time when each does what is good in his own eyes.

Meanwhile the pools are not dead. The divisions are likely to be made as agreed until the agreements actually expire, whatever the rates may be.

The thorough shipments of freight from New York to the West last January were larger than might have been expected, considering the general complaint of dullness of trade. They were about ten per cent. less than last year, 3 per cent. more than in 1883, 24 per cent. less than in 1882, 4 per cent. less than in 1880, and 60 per cent. more than in 1879. The reduction in rates does not seem to have stimulated shipments much, and it is not likely to do so much in winter, when there are no canal shipments to be diverted. The circuitous lines, chiefly by Southern roads, which always carry at a discount from the regular rates, are apt to suffer most, and these have not usually carried as much as 3 per cent. of the whole. Last January the shipments were 13½ per cent. more than in December, but in six out of the eight winters that the records have been kept the January shipments have been the larger. Ordinarily we should expect some increase in this traffic every year, but it grew fast enough in two years after 1879 to suffice for several years, and it has decreased since 1881. Scarcely anything feels so quickly the prosperity of the country. Good returns to cotton-growers in Texas, to iron manufacturers in Pittsburgh, to lumbermen in Michigan or on Puget Sound, to graziers in Wyoming, or to wheat-growers in Kansas or California, alike are followed by an increase in the shipments of goods from New York.

The grain movement last January was decidedly larger than in any previous January, and this is true of the Atlantic receipts, which had fallen off greatly of late years, as well as of the receipts of the Northwestern markets. For the last six years they have been, in the five weeks ending January 31, and corresponding periods:

Year.	Northwest.	Atlantic.	Year.	Northwest.	Atlantic.
1880.....	17,614,028	14,137,527	1883.....	30,702,696	14,515,014
1881.....	14,731,001	11,638,489	1884.....	21,797,149	8,378,871
1882.....	19,521,232	8,077,293	1885.....	25,052,078	16,097,665

This year the receipts of the Northwestern markets for the month are 15 per cent. more than last year and 42 per cent. more than in 1880, which was the best winter ever known for railroad business, and came

after extraordinary crops; the Atlantic receipts this year are 91 per cent. more than last year, 11 per cent. more than in 1883 (when they were largest), and 14 per cent. more than in 1880. Thus the grain traffic of the month was altogether unprecedented, and whatever benefit the railroads can obtain directly from a heavy grain movement has been felt. The rates on shipments to the Northwestern markets have been a little less than in previous years, but an unusually large proportion of them have come long distances, so that the freight receipts per bushel should have been larger than ever before. The regular rate from these markets was 25 cents this year, and last year it was 30 cents, except for ten days, when it was 20 cents; there was much irregularity both months, the average rate this year probably not being more than 10 or 12 per cent. less than last year. The effect of the heavy traffic on the Western railroads does not appear to be great, so far as they have reported, such great grain carriers as the Milwaukee & St. Paul showing an increase of but ¾ per cent. in earnings, the Chicago & Northwestern an increase of a trifling decrease, the Burlington, Cedar Rapids & Northern a decrease of 4½ per cent., the Chicago & Alton a decrease of 3½ per cent. But the heavier grain movement has doubtless done more good than here appears, for there has been a decrease in much other traffic on most roads. The lines carrying to the East should have gained more in proportion, compared with last year, the shipments being so much larger; but none of these have reported their January earnings yet.

The gain in Northwestern receipts over last year has been chiefly at St. Louis and Duluth. The gain at Duluth is 1,033,948 bushels, which is 826 per cent., it never before having had any winter receipts worth mentioning. The increase at St. Louis is 1,952,028 bushels (64 per cent.). Chicago gained but 3 per cent., Milwaukee 22 per cent., Detroit 44 per cent.; while Toledo lost 36 per cent. and Peoria 7½ per cent. St. Louis has not had so large a share of the grain before since 1880, when it received 25.4 per cent. of the whole, against 20 per cent. this year. Chicago, however, had a larger share than this year only in 1884 and 1882.

The quarterly report of the New York Central & Hudson River Railroad gives the following as the results of the working for the last three months of 1884, compared with the previous year:

	1884.	1883.	Inc. or Dec.	P. c.
Gross earnings.....	\$6,810,170	\$7,914,128	—	\$1,103,958 14.0
Expenses.....	3,933,086	4,681,799	—	748,713 16.0
Net earnings.....	\$2,877,084	\$3,232,329	—	\$355,245 11.0
Int. rents and taxes.....	1,500,000	1,395,000	+	105,000 7.5
Profit.....	1,377,084	1,837,329	—	460,245 25.0
Per share.....	\$1.54	\$2.00	—	\$0.52 25.0
Dividends.....	1,341,425	1,788,506	—	447,141 25.0
Surplus.....	\$25,059	\$48,763	—	\$13,104 26.8

The quarter was an extremely unfavorable one in many respects. In it first was felt the effect of the reduction of the local fares to 1 cent per mile, made about Oct. 20, and through passenger fares very, very low throughout. The east-bound freight was demoralized more or less, but not so much so as in the spring months, and the through rates on west-bound freight were pretty well maintained. The situation has grown worse since only by the reduction of through west-bound rates, which is an important matter to this road—more so than to any other. That under these circumstances the road should have been able to earn 1½ per cent. on its stock is surprising. The statement for 1883 included in earnings the receipts for use of cars on foreign roads, and in expenses the expenditures for the use of foreign cars. This year only the excess of one over the other is given—the payments are usually much the larger. This increased both earnings and expenses last year, and exaggerates the decrease shown this year. It does not change the net earnings.

This is usually the best quarter of the year for this railroad. In the last fiscal year, while the profit per share was \$2.06 in this quarter, in the other three quarters it was but \$3.16. Should it be no larger this year, the profit per share for the year will be \$4.70. Everything is more unfavorable now for this road except the bulk of east-bound freight, which is likely to be much larger than last year, and is not likely to be carried at lower rates, as the rates after this time were very low last year.

The only comparison possible with corresponding periods previous to 1883 is of gross earnings with those of the three years 1878, 1879 and 1880, which were:

1878.	1879.	1880.	1883.	1884.
\$7,575,789	\$8,540,638	\$8,070,145	\$7,914,128	\$6,810,170

The decrease since 1880 is \$2,160,000, or 24 per cent.,



and the decrease from 1883 to 1884 is but little greater than that from 1880 to 1883.

Great Britain being already completely supplied with railroads, but doing a large part of the ocean transportation for the rest of the world, ship-building there has something of the importance of railroad building here. It is active in periods of great prosperity, and falls off greatly and suddenly when business is dull. In one thing it differs from railroad building. The railroad now built remains permanently. The work required to maintain it does not appear as so many miles of railroad, but simply as a part of the working expenses of the road. But the records of ship-building include all the vessels built to replace those lost or condemned.

The tonnage of vessels launched at the five principal ship-building centres of Great Britain in each of the last six years has been:

1879.	1880.	1881.	1882.	1883.	1884.
461,238	597,905	781,053	945,919	997,410	587,463

Thus after a steady increase for four years, amounting to 115 per cent. from 1879 to 1880, there is a decrease of 41 per cent. in a single year, which is more than the gain made from 1880 to 1883 and 2½ times the gain made in any one year. This may be compared with the decrease in railroad construction here from 11,596 miles in 1882 to 6,753 in 1883 (41½ per cent.). So far as iron consumption is concerned, the British ships may well be compared with the American railroads. The rails alone on 11,596 miles of railroad weigh about 1,100,000 tons, while the iron entering into the 1,036,408 tons of vessels built in Great Britain in 1883 weighed about 770,000 tons.

Counting only a gross ton of capacity to a ton of hull, the British vessels built in that year would carry as much as 57,580 modern American 20-ton freight cars, of which 38,210 were added during 1883 to the stock in the United States. The vessel tonnage built in Great Britain was partly for revenues which did not increase the total tonnage afloat, and nearly one-seventh of it was built for foreign countries.

Steel is now largely used for vessels in Great Britain, and though iron still prevails, the use of steel increases. In 1883, of the tonnage of vessels built on the Clyde, 31 per cent. was steel; in 1884, 43½ per cent. This exaggerates the proportion of steel now used, however, as nearly all the steel vessels seem to be built on the Clyde. Last year, of the tonnage registered at the two leading under-writers' agencies, just one-sixth were steel, and not 2 per cent. were wood.

The last year for which we find reported the total British vessel tonnage afloat is 1882, when it was 6,908,000 tons, carrying, say, as much as 383,800 American freight cars. That year there were 710,000 freight cars on our railroads, but their average capacity must have been a good deal less than 20 tons.

As bearing upon the extent to which vessels are built for renewals, it may be said that 2,098,811 tons of new vessels were added to the registry of British vessels from 1879 to 1882, the total British tonnage meanwhile increased only 416,000 tons, indicating that an average of 429,000 tons a year were renewed.

#### The Chicago, Milwaukee & St. Paul.

The Chicago, Milwaukee & St. Paul Company makes its preliminary statement of earnings, expenses, fixed charges, etc., for the last calendar year later than usual, though perhaps never was a time when it was awaited with so much interest by the stockholders. There has been evidently some distrust of the company, as the common stock, which has for several years paid 7 per cent. dividends yearly, and in 1882 sold above 113 after the last stock dividend, has been selling below 75 for some months, though the full dividend was paid as usual. The company has been making extensions for years on a colossal scale, and doubtless many of the new lines will require, in time, large expenditures for improvements. Such a company may have occasion to incur a great floating debt in a short time, if it is not able to issue new bonds or stock, and the stockholders therefore are especially interested in knowing their company's financial condition at frequent intervals. Moreover, though the Chicago, Milwaukee & St. Paul has an exceptionally light capital account, the proportion of bonds to stock is unusually great—about 100 millions of bonds to 47½ millions of stock. Thus a comparatively small reduction in the net earnings per mile will take away a considerable part of the dividends, much the larger part of the net earnings, as they are now, being required for the bonds. The converse of course is true: an addition of only \$100 per mile to the net earnings will pay 1 per cent. on the capital stock, and with net earnings per mile less than many of the Chicago roads have, it could pay 14 per cent. instead of 7. Just now, however, losses are feared more than gains are hoped for, as the price of the stock conclusively shows. So far as the common stock is concerned, its share of the profits is further limited by the \$16,541,000 of preferred stock, which must have 7 per

cent. if it is earned. This and the interest charges required all but \$3,350,000 of the net earnings in 1883. It requires \$309,042 to pay 1 per cent. on the common stock, but this is only a little more than 3 per cent. of the net earnings of 1883. In a year when some roads have had a decrease of 10, 15 and 20 per cent. in their net earnings, it is not to be wondered at that the St. Paul stockholders became a little anxious, notwithstanding the fact that the gross earnings of their road, reported weekly, were very nearly as great in 1884 as in 1883.

The statement made for 1884, compared with 1883, is as follows:

	1884.	1883.	Inc. or Dec.
Gross earnings.....	\$23,470,908	\$23,650,823	Dec. \$188,925
Operating expenses, including taxes and insurance.....	13,859,629	13,778,037	Inc. 81,592
Net earnings.....	\$9,611,369	\$9,881,786	Dec. \$270,417
Interest.....	5,918,608	5,373,926	Inc. 544,682
Balance.....	\$3,692,761	\$4,507,860	Dec. \$815,099
Dividends.....	3,321,167	3,212,895	Inc. 108,272
Balance.....	\$371,594	\$1,294,965	Dec. \$923,371
Other income.....	82,306	164,707	Dec. 82,401
Surplus.....	453,900	\$1,459,672	Dec. \$1,005,772

Actually, then, there was a million dollars less profit for the stockholders in 1884 than in 1883, which is equal to \$3.70 per share of common stock; and it is because there was a large surplus in 1883 that, in spite of this reduction, the company was able to pay 7 per cent. on common and preferred. The profit per share of stock (both common and preferred) was \$7.96 in 1884, against \$10.54 in 1883 and \$10.61 in 1882.

The decrease from 1883 to 1884 is thus 24½ per cent., which is more than the decline in the common stock within a year.

A property like this, however, should not be valued by the returns of any single year. Evidently it is not, but when highest has been very much lower than the profit per share would warrant. It has earned for years about 10 per cent. on the market price—last year, according to this statement, about 10.7 per cent. on the present market price. Apparently the investing public is less confident of the great increase in the profits of this stock which a moderate improvement in its net earnings would make possible than they are suspicious that some disaster may befall it. A reduction in the dividend could not be called a disaster. Half the recent rate of 7 per cent. would be nearly 5 per cent. on the present price, and a total suspension of dividends should not be deemed a disaster for a stock which, like this, has great expectations, when the country on its great mileage of new lines shall have been fairly occupied and cultivated, and there is the normal degree of prosperity in the growing country which it serves. Only a fear that some hidden danger exists can justify such prices for such a property.

Without doubt a large amount of capital will have to be expended on the vast system of roads, much of it new, which this company owns, and without doubt the rates will have to be reduced, year by year, especially in the western parts of the system. That has been the experience of every Western road. But the new capital will be required because of a growth of traffic, and the new traffic will add to the profits of the road. The expenditures will probably be needed gradually, as the traffic grows, and where the traffic does not grow, little or no new capital should be required. It is conceivable, to be sure, that with a large floating debt, and the borrowing power of the company exhausted, it might become necessary to divert net earnings from dividends to new construction; and it is certainly desirable not to increase the present excess of funded debt over share capital. Thus, when the time comes that new capital is indispensable, it may be necessary either to issue new stock to obtain it, or to use the net earnings. But if the stock bears no better price than now, capital raised by new issues of stock would cost very dear, and it would be better for the present holders to yield up their dividends in order to meet the requirements of the company. If the stock were at par or above, this would be the simple, easy and natural way out of the difficulty. The company could give the option of cash or stock, as the Pennsylvania Railroad Company has been doing for some years, and by making its fixed charges a smaller proportion of its net earnings would greatly strengthen its financial position. So far, the accounts do not show that any such step will be necessary. It depends very much on the amount of the floating debt. If it should be necessary, that is, if the company, while earning a dividend, should not pay one in cash, but apply the money for capital purposes, it would be none the less a profit to the shareholders, though the effect on the price of the stock might be bad. The amount of the common stock is so small, however, that the capital that can be secured in this way in any one year is not very great—less than \$2,200,000.

#### Erie Earnings in December.

The report of the New York, Lake Erie & Western Railroad for December gives the earnings and expenses of the Erie proper (excluding the leased New York, Pennsylvania & Ohio) as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Gross earnings.....	\$1,464,975	\$1,462,925	—	\$20.25 13.7
Expenses.....	806,926	1,195,622	—	\$67.916 22.4
Net earnings.....	\$335,014	\$267,303	+	\$67.711 25.3

Thus there is a large decrease of earnings, but so very large a decrease of working expenses that the net earnings are increased one quarter. This, however, is not so great a gain as might be supposed, because the net earnings were so extremely small in 1883 that an increase of one-fourth is but a small sum.

For eight years the gross and net earnings and working expenses of the road in December have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1877.....	\$1,465,153	\$1,003,874	\$461,279
1878.....	1,205,755	900,029	305,726
1879.....	1,398,245	1,048,477	349,768
1880.....	1,726,788	1,229,605	497,183
1881.....	1,571,208	1,189,826	381,382
1882.....	1,691,404	1,249,665	441,739
1883.....	1,462,925	1,195,622	267,303
1884.....	1,262,720	827,706	335,014

The gross earnings were smaller last December than in any other year except 1878, and were 31 per cent. less than in 1882, when they were largest. The working expenses also were less than in any other year except 1878, and 96 per cent. less than in 1882, and the net earnings, while 25 per cent. more than in 1883, were 24 per cent. less than in 1882, and less than in any other year except 1878. The net earnings are always much below the average in December. For six successive months they have been for two years:

	1884.	1883.	1884.	1883.
July.....	\$450,879	\$563,522	Oct.....	\$578,662
Aug.....	621,234	908,521	Nov.....	452,238
Sept.....	846,366	896,206	Dec.....	335,014
				267,303

The December receipts were 73 per cent. less than the November receipts in 1883, and only 26 per cent. less in 1884. But last year they fell suddenly from the largest the road had ever had to the smallest it had ever had; and this was due not only to a large decrease in earnings, but to a large increase in expenses; for the expenses were much above the average in December of 1883, and \$138,000 more than in November. This year they are about equal to the average of the past seven months. For six months of 1884 the working expenses have been:

	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	\$1,007,307	\$913,193	\$886,373	\$932,497	\$919,281	\$927,706

The reduction of expenses, therefore, was not peculiar to December, but has been shown for many months. There was a profit of \$15,329 on the lease of the New York, Pennsylvania & Ohio road last December, against a loss of \$40,961 in 1883; and the Erie's income from the two systems was thus \$350,343 in 1884, against \$226,342 in 1883, an increase of \$124,001, or 55 per cent., leaving them, however, less than the net earnings of the Erie alone for three years previous.

The earnings and expenses of the New York, Pennsylvania & Ohio road were:

	1884.	1883.	Inc. or Dec.	P. c.
Gross earnings.....	\$454,448	\$530,358	—	\$77.910 14.7
Expenses.....	292,336	401,604	—	109,268 27.2
Net earnings.....	\$160,112	\$128,754	+	\$31,358 24.4

The decrease in earnings was therefore at a greater rate than on the Erie proper, but the decrease in working expenses was much greater, resulting in an increase of 24½ per cent. in net earnings.

The gross earnings of this road in December for six years have been:

Year.	1879.	1880.	1881.	1882.	1883.	1884.
	\$404,114	\$473,361	\$481,318	\$503,705	\$530,358	\$454,448

Thus they were smaller last December than in any other since 1879. The working expenses were charged differently before the lease, but what were reported as net earnings were less than last December in every year except 1882.

For the three months of the company's fiscal year ending with December the gross and net earnings and working expenses of the Erie proper have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1877.....	\$1,571,410	\$2,897,253	\$1,674,166
1878.....	4,060,678	2,617,384	1,443,294
1879.....	4,627,776	3,004,089	1,623,687
1880.....	5,424,035	3,294,744	2,129,291
1881.....	5,101,544	3,454,900	1,646,644
1882.....	5,329,237	3,486,964	1,842,273
1883.....	5,222,565	3,449,581	1,772,984
1884.....	4,145,397	2,779,484	1,365,913

Thus the gross earnings and also the working expenses for the three months were less in 1884 than in any other year except 1878, and the net earnings less than in any other year without exception. Compared with 1883 the decreases are:

	Gross earnings.	Expenses.	Net earnings.
Amount.....	\$1,077,168	\$670,097	\$407,071
Per cent.....	20.6	17.1	23.0

The net earnings this year for the quarter were about one-fifth yearly of the charges for interest, car-trust payments, etc. In 1883-84 nearly one-third of the net earnings of the year were made in these three months; in 1882-83 little more than one-fourth of them; in 1881-82, (with the railroad war raging in that quarter), more than a quarter; in 1880-81, 28 per cent. of them; in 1879-80, 23 per cent. Taking the lowest of these figures (which is most favorable for the future), the net earnings for the current year will be but little less than \$3,000,000; taking the highest, they will be only \$4,270,000.

For these three months there was a profit of \$100,097 on the lease of the Ohio road, against a loss of \$195 in 1883, so that the Erie company's income from the two was \$1,468,010 in 1884, against \$1,772,789 in 1883, the decrease being but \$306,779, or 17½ per cent., the income having been increased more than 7 per cent. by the profit on the leased road, which thus has proved a valuable possession in one of the most unfavorable seasons, when it was most likely to be unprofitable.

The earnings and expenses of the New York, Pennsylvania & Ohio for the three months have been:

	1884.	1883.	Decrease.	P. c.
Gross earnings.....	\$1,464,975	\$1,784,016	\$319,041	17.9
Expenses.....	806,926	1,093,327	286,401	24.9
Net earnings.....	\$568,889	\$590,689	\$21,800	3.7

Here the decrease in expenses has been nearly as great as the decrease in earnings, leaving but a small decrease in the net earnings.

For six years the gross earnings of this road have been:

Year.	1879.	1880.	1881.	1882.	1883.	1884.
	\$1,290,369	\$1,434,878	\$1,409,489	\$1,600,339	\$1,784,016	\$1,464,975

Thus they were larger in 1884 than in any year previous to 1882, though the gross earnings of the Erie proper were



smaller in 1884 than in any other year except 1878. This is an indication that the lease has given this road a larger business than it previously commanded.

#### January Earnings.

January earnings have now been reported by 42 railroads, 24 of which show an increase compared with last year. In the aggregate they had:

	1885.	1884.	Increase.	P. c.
Earnings.....	\$19,042,047	\$12,482,472	\$6,559,575	4.5

The increase in mileage has been comparatively small, and the earnings per mile must have been about the same in both years.

This is more than half the number of companies that report, but only about two-fifths of their aggregate earnings.

The result shown would be more satisfactory if there had not been a great decrease in January last year, averaging for all the railroads reporting more than 9 per cent. For many roads, to do as well this year as last is to do very badly. To show better the course of earnings, we give below the January earnings of some of the roads for five years past. The increase in mileage since last year has not been great, but since the other years it has been very great for some railroads.

Of the four roads northwest of St. Paul the Canadian Pacific has increased its mileage so greatly since last year, the Northern Pacific since 1883 and the Manitoba since 1882 that the comparison with the earlier years has not much significance. The January earnings of the four have been:

	1881.	1882.	1883.	1884.	1885.
Canadian Pac.....	\$180,000	\$261,000	\$302,000	\$302,000	\$302,000
Northern Pac.....	\$116,508	\$245,369	\$358,985	\$14,103	\$56,092
St. P. & Man.....	\$54,187	\$95,461	\$48,703	\$49,377	\$66,125
St. P. & Duluth.....	65,502	71,461	71,494	79,860	79,860

Compared with last year, the Canadian Pacific has an increase of 50 per cent., yet earned only \$140 per mile; the Northern Pacific has a decrease of 9½ per cent., partly chargeable to the blockade of its Oregon connection for a short time in the first part of the month, which arrested all through traffic, and partly, probably, to a diversion of about half of that traffic to the new Oregon Short Line. The Manitoba has a gain of 4 per cent., and the St. Paul & Duluth a gain of 10½ per cent., and both did better than in any previous January.

Compared with last year the Central Pacific shows the large gain of 13½ per cent.; but its earnings were exceptionally light last year, and for six years have been in January:

	1880.	1881.	1882.	1883.	1884.	1885.
\$1,200,614	\$1,602,907	\$1,839,469	\$1,747,681	\$1,449,785	\$1,642,030	\$1,642,030

Thus, in spite of the gain over last year, the earnings are less than in 1883 and 1882.

Some of the principal roads west and northwest of Chicago have had the following earnings in January:

	1881.	1882.	1883.	1884.	1885.
Chic., Mil. & St. P.....	900,848	1,434,537	1,359,190	1,467,096	1,518,000
Chic. & N. W.....	1,240,667	1,644,936	1,357,622	1,502,418	1,498,100
Chic., St. P., M. & Om.....	257,785	327,478	308,465	350,600	334,700
Ill. Cen. in Iowa.....	119,827	158,483	121,942	131,512	104,300
Burl. C. R. & Nor.....	167,750	252,823	197,402	213,863	223,719
Chic. & Alton.....	493,120	585,830	646,386	666,639	644,385
Ill. Cen. in Ill. & So. Div.....	857,804	860,970	979,717	826,572	885,200

If we except the Illinois Central, whose gain was probably all on its Southern Division and out of the territory here considered, these roads earned very nearly the same this year as last, with but small increase in mileage, and four of them also earned more than in 1883; but, in spite of a large increase in mileage since, the earnings of the Northwestern, the Iowa lines of the Illinois Central, and the Burlington, Cedar Rapids & Northern were larger in 1882 than this year, and the gains of the Milwaukee & St. Paul and the St. Paul & Omaha since then are insignificant in comparison with their increase in mileage.

In the South the following roads have earned in January:

	1881.	1882.	1883.	1884.	1885.
Louis. & N. W.....	\$8,690	\$994,527	\$1,118,735	\$1,039,317	\$1,165,735
Mobile & O.....	224,346	150,676	216,212	179,228	207,610
Ches. & Ohio.....	102,540	208,746	211,908	280,621	288,176
Rich. & Dan.....	298,638	259,737	269,880	322,000	322,000

All these roads, except the Mobile & Ohio, had larger earnings this year than in any other of the five, and compared with last year the other four roads of the Richmond & Danville system and the other three of the Chesapeake & Ohio system all show gains, as does the Norfolk & Western, the Shenandoah Valley alone of Southern roads showing a decrease.

The worst showing, perhaps, is that of some lumber roads: the Chicago & West Michigan has a decrease of 30 per cent., the Detroit, Lansing & Northern one of 20 per cent., and the Flint & Pere Marquette one of 22½ per cent. The Green Bay, Winona & St. Paul also had a decrease of 28½ per cent., and earned only \$100 per mile. It is in or near to a lumber country, but does not carry much lumber or anything else.

The St. Louis & San Francisco road, which had large gains until recently, suffered a trifling decrease in January, having then much larger earnings than in any year previous to 1884; the Denver & Rio Grande had a small decrease, having had a large one last year, and earned 24 per cent. less than in 1882 with a much smaller mileage.

There was an extraordinarily large grain traffic last January, which must have done the Western roads a great deal of good; that, on the whole, they did not do better than last year, when they did not do very well, was not due to a light movement of farm produce, but in spite of a heavy one.

#### Heavy Chicago Shipments.

Chicago through shipments eastward for the week ending Feb. 7 were again enormous, even a little greater than the week before, and among the largest on record, though exceed-

ed in some weeks last spring. For that week and corresponding weeks of five previous years they have been:

	1880.	1881.	1882.	1883.	1884.	1885.
	38,493	53,290	73,425	43,388	41,834	81,375

Thus the shipments this year were nearly twice as great as last year, and nearly 12 per cent. more than in 1882, when, down to this year, they were largest.

The largest weekly shipments recorded heretofore, including all of more than 70,000 tons, have been:

Week to—	Tons.	Week to—	Tons.
March 20, 1880.....	73,439	March 7, 1883.....	72,051
" 27, ".....	87,600	" 29, 1884.....	80,800
April 16, 1881.....	73,302	April 5, ".....	90,753
June 25, ".....	81,000	" 12, ".....	97,653
Jan. 15, 1882.....	70,724	" 19, ".....	82,906
" 22, ".....	77,679	Jan. 31, 1885.....	75,737
" 29, ".....	80,525	Feb. 7, ".....	81,075
Feb. 6, ".....	73,425		
Dec. 31, ".....	73,330		

Thus last week's shipments have been exceeded only in the fourth week of March, 1880 (at a 35-cent rate), and in three weeks of April last year (at a 15-cent rate). Except those of the two March weeks in 1880, and perhaps that in March, 1883, all these heavy shipments were made at cut rates, and generally at very low rates. Those in June, 1881, were in the first week of the open railroad war of that year, at a 15-cent rate; those of the four weeks in January and February, 1882, were the closing shipments of that railroad war, carried at 10 and 12½ cents. Those of the last week of 1882 were not probably at a very large reduction from the 30-cent rate then in force. The enormous ones last spring were made directly after the reduction of the rate to 15 cents, which gave the railroads enormous quantities of grain which had been held for the opening of navigation. Those of the last two weeks probably paid an average rate of something more than 20 cents and yielded a larger amount of gross earnings than those of any of the other weeks noted except the two in 1880. The shipments are so very large that a reduction from regular rates is evidently unnecessary; but probably a considerable part of the grain last week and most of it the week before was engaged at 20 cents per 100.

The shipments for six successive weeks, and the percentages carried each week by the several roads have been:

	Jan. 3.	Jan. 10.	Jan. 17.	Jan. 24.	Jan. 31.	Feb. 7.
Flour.....	9,394	11,830	10,905	7,247	14,914	19,219
Grain.....	19,362	29,772	42,977	32,095	50,340	52,131
Provisions.....	10,648	13,003	13,171	10,088	10,483	10,055
Total.....	39,404	54,611	67,053	50,330	75,737	81,375
Per cent.						
C. & Grand T.....	20.4	19.3	15.8	11.0	6.5	7.0
Mich. C. N.....	20.0	24.3	29.0	24.4	29.0	8.3
Lake Shore.....	14.5	9.0	12.3	17.7	21.3	29.4
Nickel Plate.....	11.5	13.3	8.3	6.4	4.5	3.3
Ft. Wayne.....	15.0	14.9	7.7	8.8	13.6	20.0
St. L. & P.....	6.3	6.1	8.4	14.4	7.0	11.0
Balt. & Ohio.....	7.2	7.0	6.3	3.6	7.4	7.8
Ch. & Atl.....	5.1	5.5	12.2	13.7	10.7	13.2
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

The chief increase in shipments last week over the previous week was in flour, and it is noticeable that there has been no increase in provision shipments for the six weeks, while the flour shipments have doubled and the grain shipments have nearly trebled. So large an increase in flour shipments is unusual for flour is usually shipped nearly as fast as it is ground, and not held in large quantities to be shipped by lake, like grain.

The percentages show some remarkable changes, nearly all in the direction of evening the percentages in the pool. The greatest change is by the Michigan Central, which heretofore, though far ahead in the pool, has continued to increase its excess. But last week it reduced its share by nearly three-fourths, and its place was taken by the Lake Shore, which has been behind, but in this week of immense shipments demonstrated its capacity by taking 29½ per cent. of them. The Nickel Plate, which has been over, carried but an insignificant part of the shipments last week; the Fort Wayne, which is behind, a larger share than for many weeks previous, and the Chicago & Atlantic, which is far behind, also an exceptionally large share of the exceptionally large total shipments.

The Fort Wayne carried more provisions than any other road, the Chicago & Grand Trunk, which is often ahead, standing only sixth. The Chicago & Atlantic, which usually does not carry much provisions, had 13.9 per cent. of them last week. The Lake Shore carried 32.7 per cent. of the flour and 30.6 of the grain.

These enormous shipments cannot be wholly due to a reduction from the regular rate, for there has probably seldom been a time of cut rates when shippers less expected an advance. They are, indeed, only about what was to be expected in view of the large crops, the large receipts of grain and hogs and the great accumulation in Chicago elevators. At the regular rate of 25 cents for grain and 30 for provisions a very heavy movement is probable until the opening of navigation.

#### Car-Heater Explosions.

Two instances of car-heaters exploding have been lately brought under our notice. In one case two train-hands were scalded, and the sleeping passengers, badly scared, rushed on the platform in scanty night attire. In the other, the car was considerably damaged, one end being almost completely blown out. Both explosions were probably caused by the safety-valve sticking fast.

In the majority of steam car-heaters, the safety valve is out of sight, and the heater is in the charge of a comparatively unskilled attendant; and to meet this difficulty, heaters are constructed to take care of themselves as far as possible. This is all very well, but the fact that explosions do occur shows either that this principle is not carried quite far enough, or that greater care should be taken to examine safety valves frequently, and make sure that they are in working order.

There exists at least one system of steam heating which re-

quires neither safety-valve nor pressure-gauge. It was invented many years ago by an ingenious mechanic, Loftus Perkins, but the patent having long ago expired, no sufficient commercial inducement remained to push its adoption, and it is now almost forgotten, except in certain trades where it is largely used. The usual coil of pipe is made of wrought-iron of considerable thickness, and small bore, and capable therefore of safely standing a pressure of 1,000 lbs. per square inch. This coil is partly filled with water, and welded up throughout, no screwed joints of any kind being used. The finished coil is therefore a solid wrought-iron tube, and leakage is impossible. As the pressure rises, the temperature of the steam, and consequently of the part of the pipe exposed to the air, rises in a corresponding degree, and the greater the difference between the temperature of the pipe and of the air, the greater the radiation. This radiation, of course, tends to prevent the pressure rising further.

Thus the safety valve is really the cooling power of the air which prevents the pressure rising beyond a safe limit. Whether this principle, in a possibly somewhat modified form, might not be applied to car-heaters is a question that can only be solved by actual experiment. A heater with no filling, hole, no safety-valve, and pipes of enormous strength, would possess elements of safety and simplicity which should do much to recommend it. As the water or liquid used remains permanently within the pipes and does not need renewing, one non-freezing compound, too expensive for ordinary use, might be conveniently employed.

This method of preventing the pipes becoming frozen might possibly be open to the objection that the mixture used might prove such a poor conductor of heat that the part of the coil in the fire might become overheated. As the pressure, and consequently the temperature of the water in the pipes, would at times be considerably higher than obtains in ordinary practice, the danger of overheating the coil is sensibly increased. A few practical experiments would soon show whether this difficulty is serious, or can be avoided by the use of a suitable liquid.

Mr. Isham Randolph, Chief Engineer of the Chicago & Western Indiana and the Belt Railroad of Chicago, has devised and now has in successful operation a system of interlocking semaphores with two to four or more switches, by means of a wire cable, in such manner that it is impossible to move any one of the switches from the position of "main line open" without first changing the semaphore from safety to danger. The apparatus is not designed as a substitute for the more elaborate and complete systems, but simply as an additional safeguard where the established and more perfect types of interlocking apparatus are regarded as too expensive. No extra employees are required, and no attempt is made to secure safety signals by interlocking for anything but the main line.

An interlocking lever, similar to an ordinary switch lever, is placed across each switch-rod so as to interlock therewith. The cable is fastened at one end to the semaphore, and at the other to the most distant of these interlocking levers. Each of the intermediate levers carries a pulley, over the top of which the cable passes, after passing under some fixed pulleys at each side, the three standing relatively to each other in this position, the upper pulley being carried on the interlocking lever.

It will be seen that by throwing the lever forward, carrying the upper pulley, slack will be introduced into the cable which will cause (or, rather, permit) the semaphore to fall to danger. The same is of course true if the most distant lever be moved to which the cable is directly attached.

After setting the switches for side-track, the form of the levers is such that the signal cannot be replaced to safety until the switches have been set right. All this is very simply accomplished, and the cost of the whole apparatus, which is described more fully in the *Journal of the Association of Engineering Societies*, is apparently very small.

The disastrous consequences of substituting "flanged" or flat-footed rails of the American pattern, weighing 70 lbs. per yard, in place of double-headed chair rails weighing 75 lbs. per yard, is gravely pointed out in *Engineering* from the following experience in New South Wales: That whereas on the older lines, with chair rails, the cost of maintenance of way per train mile is but 21 cents, on the extensions with the lighter permanent way it is 28 cents, while on a branch "light railway," built at a cost of \$20,000 per mile and which has never paid even operating expenses, it is 48 cents per train mile.

A more probable explanation of the difference in cost of maintenance per train mile is that the flat-footed rails are on the lines with the lightest train mileage, which may make a very great difference, as is seen on almost every railroad which has branches with light traffic, for the maintenance per train mile often costs much more than on its own lines with heavy traffic even if both have precisely the same kind of rails.

It is reported that the Midland Railway of England has now in course of construction some new express engines with 8 ft. drivers and 20 × 28 in. cylinders, to enable it better to compete for the Manchester-London traffic with the London & Northwestern.

Mr. Emile Low sends us an extract from the German work of Dr. Herman Scheffler, published in 1857, in which, among the dimensions of stone arches (culverts), the depth of arch stones and thickness of abutments at springing lines have been calculated for depths of masonry "filling" varying from 2 to 80 ft., which is equal to 2½ to 100 ft. of earth fill-











convention in Washington, beginning on Tuesday, June 16. The *Car Accountants' Association* will hold its annual convention at Minneapolis, Minn., beginning on Tuesday, June 23.

The *Master Car-Builders' Club* will hold regular meetings at its rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The *New England Railroad Club* will hold its regular meetings at its rooms in the Boston & Albany station, in Boston, on the evening of the fourth Wednesday in each month.

The *Western Railway Club* will hold regular meetings at its rooms, No. 103 Adams street, Chicago, on the third Wednesday in each month.

#### Foreclosure Sales.

The *Ohio Central Railroad* will be sold in Toledo, O., April 15, at noon, under a decree of foreclosure granted by the United States Circuit Court. The sale will include the line from Toledo to Corning, with the branch to Columbus, about 200 miles of road, with all the equipments and other property, but does not include the River Division. The property will be sold in one lot, and for not less than \$1,000,000, and the purchaser must deposit at the time of sale \$50,000 in cash or \$200,000 in bonds. The purchaser will be required to pay in cash such amount of money as the Court may direct, sufficient to cover claims which may be decided to be prior to the first mortgage. The balance of the purchase price may be paid either in cash or in the first-mortgage bonds of the company, at such *pro rata* value as may be fixed for them by the Court.

#### Mail Service Extensions.

Daily mail service has been ordered over the *Fargo & Southern* road, from Ortonville, Minn., to Fargo, Dak., 120 miles, beginning Feb. 10.

#### Master Car-Builders' Club.

A business and social meeting of the *Master Car-Builders' Club* will be held at the rooms, No. 113 Liberty street, New York, Thursday, Feb. 19, at 8 p. m.

*Subject for Discussion:* "Freight-Train Brakes, and Standard Freight Car Body and Trucks."

#### Brotherhood of Locomotive Engineers.

A union meeting of the *Brotherhood* was held in the Grand Opera House, New York, Feb. 8, under the auspices of Unity Division, No. 295, of New York. Grand Chief Engineer P. M. Arthur presided, and about 1,000 members were present, representing divisions in all parts of the country. The meeting was very successful, and was much enjoyed by those present.

A similar meeting is to be held in Boston before long.

#### New England Railroad Club.

The regular monthly meeting of this Club will be held at its rooms, Boston & Albany station, Boston, on Wednesday, Feb. 25, at 7:30 p. m.

*Subject for Discussion:* "Rules governing the condition of and Repairs to Freight Cars for the interchange of Traffic."

Any other subject may be presented for the consideration of the Club should time permit.

It is earnestly requested that all interested in any way in the interchange of cars make a special effort to be present to take part in the discussion.

#### Michigan Engineering Society.

The *Michigan Engineering Society* will hold its annual meeting in the State Capitol, at Lansing, beginning Feb. 17 and continuing on the two following days. A large number of papers of interest to engineers will be read, reports of committees will be presented and other business transacted. A large attendance is expected. Among the papers noted are two of special interest to railroad engineers: one on Maintenance of Way, by Mr. E. Tredwell, Assistant Roadmaster of the Flint & Pere Marquette road, and one on the Location of the Rocky Mountain Division of the Canadian Pacific, by Mr. F. P. Davis, formerly Resident Engineer on that road.

#### ELECTIONS AND APPOINTMENTS.

*Augusta, Gilson & Sandersville.*—At the annual meeting in Augusta, Ga., Feb. 3, the following were elected: President, R. M. Mitchell; directors, W. B. Young, John Davison, C. H. Howard, W. T. Gary, N. W. Murphy, Thomas Warthen, J. K. Hines, James J. Davis, J. A. Smith, James Stapleton, John B. Williams and W. J. Pollard.

*Baltimore & Ohio.*—The following circular has been issued by General Manager Dunham:

"By authority of the President, Mr. W. P. Harris is appointed Superintendent, in charge of the Main Stem Division west of Cumberland, including the Cumberland yard. His headquarters will be at Cumberland, Md. He will report and be responsible to the General Superintendent."

Mr. Harris was recently Division Superintendent on the Louisville & Nashville, and had served previously on the Chesapeake & Ohio and the New York & Greenwood Lake roads.

The Mayor and City Council of Baltimore have appointed the following city directors in this company: Benjamin F. Uman, Edward L. Bartlett, Samuel E. Atkinson, Robert Ober, Michael Coakley, Jacob W. Hook, and J. Frank Supplee.

*Boston & Albany.*—At the annual meeting in Boston, Feb. 11, the following directors were chosen: Henry Colt, Jarvis N. Dunham, Pittsfield, Mass.; Edward B. Gillette, Westfield, Mass.; James A. Rumrill, Springfield, Mass.; Edward L. Davis, Worcester, Mass.; John Cummings, Woburn, Mass.; Jacob C. Rogers, Peabody, Mass.; G. O. Crocker, New Bedford, Mass.; Moses Kimball, C. S. Sargent, Brookline, Mass.; Wm. Bliss, John C. Phillips, Mahlon D. Spaulding, Boston.

*Boston, Barre & Gardner.*—At the annual meeting, Feb. 4, the following directors were chosen: Calvin Foster, W. W. Rice, Charles G. Reed, Stephen Salisbury, Samuel R. Heywood, A. George Bullock, Henry M. Witter, William H. Morse and Edward M. Vaill, Worcester, Mass.; Franklin Eaton, Gardner, Mass.; Nelson D. White, Winchendon, Mass. At a meeting of the directors William H. Morse was re-elected President; William E. Starr, Clerk and Treasurer.

*Bradford, Eldred & Cuba.*—Mr. Thomas C. Platt has been appointed Receiver of this road by the New York Supreme Court.

*Burlington, Cedar Rapids & Northern.*—The following circular has been issued by President C. J. Ives: "Mr. C. Stickney having resigned the position of Assistant Treasurer and Paymaster, to take effect on Feb. 1, Mr. S. S. Dorwart is hereby appointed Acting Assistant Treasurer, and will on Feb. 1 assume this duty in addition to his duties as Secretary. Mr. Theodore Stickney is hereby appointed Paymaster in addition to his duties as Purchasing Agent."

*Canadian Pacific.*—Mr. W. P. Kelson has been appointed General Storekeeper, with office in Montreal.

*Chicago & Great Southern.*—Mr. George C. Kimball is appointed General Manager, with office at Attica, Ind. Mr. C. H. Conklin is Master of Transportation. Mr. Kimball was

formerly General Manager of the Chicago & West Michigan road.

*Cleveland & Marietta.*—Mr. Phineas Pease, of Columbus, O., has been appointed Receiver of this road.

*Durango, Fort Lewis & Western.*—The directors of this new company are: Charles E. Averill, J. H. Christ, H. Garbanti, S. L. Moser and David J. Shaw. Office in Durango, Colorado.

*Dubuque & Sioux City.*—This company, whose road is leased to the Illinois Central, has elected Lorenzo Blackstone, Abram S. Hewitt, J. Pierpont Morgan and James A. Roosevelt directors for three years, and R. T. Wilson for one year in place of John F. Slater, deceased.

*East Tennessee, Virginia & Georgia.*—Mr. J. E. Mallory has been appointed Local Agent in Chattanooga, Tenn., in place of James Lauderdale, resigned. Mr. Mallory was recently Assistant Superintendent of the Georgia Division.

*Greenwood, Laurens & Spartanburg.*—Mr. E. T. Charlton is General Freight and Passenger Agent, with office in Augusta, Ga. He holds the same position on the Augusta & Knoxville and the Port Royal & Augusta roads.

*Indianapolis Belt.*—The new board has elected W. R. McKee, President, and A. D. Lynch, Secretary and Treasurer.

*Louisville & Nashville.*—Mr. Michael Gilhooly has been appointed Road-master of the Short Line Division (Louisville to Cincinnati), to date from Feb. 1. He was recently Supervisor of road on the Jeffersonville, Madison & Indianapolis road.

*Lowell & Framingham.*—This company, whose road is leased to the Old Colony Co., has elected directors as follows: S. N. Aldrich, F. L. Ames, H. A. Blood, John H. Buttrick, J. W. Clark, Charles F. Choate, Frank A. Day, D. E. Harding, Wm. J. Rotch, Nathaniel Thayer.

*Massillon & Cleveland.*—At the annual meeting in Massillon, O., Feb. 3, the following directors were chosen: P. G. Albright, Massillon, O.; Hon. John Sherman, Mansfield, O.; Simon Perkins, Akron, O.; J. F. Card, Cleveland, O.; J. N. McCullough, Pittsburgh, Pa.; Charles W. Cass, Louis H. Meyer, New York. The board elected L. H. Meyer, President; John J. Haley, Secretary and Treasurer.

*Memphis & Charleston.*—Assistant Superintendent J. Schaler will, for the present, act as Master of Transportation in place of F. D. Munson, resigned.

*Mexican Central.*—Mr. George W. Keeler has been appointed General Eastern Agent of this company, and will have his office at No. 261 Broadway, New York.

*Minneapolis & Eastern.*—At the annual meeting in Minneapolis, Minn., Feb. 3, the following officers were chosen: President, John G. Pillsbury; directors, S. S. Merrill, P. M. Myers, C. H. Prior, J. A. Chandler, E. W. Winter, J. M. Whitman; Secretary and Treasurer, C. H. Prior; Auditor, H. A. Gray.

*Newark, Somerset & Straitsville.*—This company, whose road is leased to the Baltimore & Ohio, has elected G. J. Foreacre, President; J. Hope Suter, Secretary and Treasurer.

*New York Central Sleeping Car Co.*—Mr. C. D. Flagg has been appointed General Superintendent of this company's lines.

*New York, Lake Erie & Western.*—Mr. R. B. Cable has been appointed Superintendent of the Susquehanna Division, and will also have charge of the Tioga Railroad. Mr. Cable was formerly Superintendent of this division, but left it two years ago to become General Superintendent of the Denver & Rio Grande. Mr. J. Jolls, for some time past Acting Superintendent, remains Chief Train Dispatcher.

*Oregon & California.*—At a meeting held in Portland, Oregon, Feb. 5, Mr. George H. Hopkinson, of London, England, was chosen President in place of Henry Villard, resigned. Mr. George H. Andrews, of Portland, formerly Secretary, was chosen Second Vice-President, in place of R. Koehler, now Receiver of the road, and Mr. W. W. Bretherton was chosen Secretary to succeed Mr. Andrews.

*Ottawa, St. Lawrence & Schenectady.*—The directors of the new company are: H. M. Herman, Fort Worth, Tex.; E. Pratt Buell, Flora, Ill.; Wm. A. Collins, Jr., New Brighton, Pa.; John B. Finley, Kittanning, Pa.; Hiram Kalt, Brooklyn, N. Y.; W. A. Barnes, A. D. Breed, George J. Gordon, Hiram A. Johnson, F. W. Partridge, Robert Sewell, George N. Torrence, Henry Weston, New York.

*Pennsylvania Canal Co.*—At the annual meeting in Philadelphia, Feb. 10, the following were chosen: President Isaac J. Wistar; directors, George B. Roberts, A. J. Cassatt, Wistar Morris, William J. Howard, Joseph N. DuBarry, Edmund Smith, M. Hall Stanton, Alexander Biddle, Simon Gratz, John P. Green, Clement A. Griscum; Secretary, Alfred Mordecai; Treasurer, Thomas P. Haviland.

*Pennsylvania Railroad Coal Companies.*—At the annual meetings in Philadelphia, Feb. 10, directors were chosen as below for the coal companies named, which are controlled by the Pennsylvania Railroad Co.: *Lykens Valley.*—President, George B. Roberts; Vice-President, Isaac J. Wistar; Directors, John P. Green, A. J. Cassatt, Wistar Morris, N. P. Shortridge, J. N. DuBarry, Edmund Smith, William J. Howard; Secretary, Alfred Mordecai; Treasurer, Thomas P. Haviland. *Mineral Railroad & Mining Co.*—The same. *Susquehanna Coal Co.*—The same. *Summit Branch.*—President, George B. Roberts; Vice-President, Isaac J. Wistar; Directors, A. J. Cassatt, Edmund Smith, Wistar Morris, N. Parker Shortridge, J. N. DuBarry, John P. Green, James W. Johnson, William J. Howard; Secretary, Alfred Mordecai; Treasurer, Thomas P. Haviland.

*Philadelphia & Erie.*—At the annual meeting in Philadelphia, Feb. 9, this company, whose road is leased to the Pennsylvania Railroad Co., elected the following directors: W. Hasell Wilson, J. N. DuBarry, Wistar Morris, Samuel Gustine Thompson, John P. Wetherill, N. Parker Shortridge, Henry D. Welsh, William J. Howard, William L. Elkins and Edmund Smith.

*Philadelphia & Reading.*—Chief Engineer H. K. Nichols has issued the following circular, dated Philadelphia, Feb. 2: "Mr. J. C. Patterson, heretofore Division Road-master, Lebanon Division, has resigned. Mr. S. H. Kupp, heretofore Division Road-master, Mahanoy Division, has been relieved of the duties of that office, and has been assigned to other service."

"The offices of Assistant Road-master and of the several division road-masters are hereby discontinued."

"Under the reorganization of the Engineering Department the following divisions are established, to take effect from this date:

"1.—Philadelphia Division, comprising the North Pennsylvania Railroad, the Delaware & Bound Brook Railroad, the Northeast Pennsylvania Railroad, the Philadelphia, Germantown & Norristown Railroad, the Chestnut Hill Railroad,

the Plymouth Railroad, the Norristown Junction Railroad, the Philadelphia & Chester Branch, the Tabor Branch, and all lines in the city of Philadelphia south of West Falls station, excepting that portion of the main line between West Falls and Port Richmond; Mr. M. F. Bonzano, Division Engineer, office at Columbia Avenue Station, Philadelphia.

"2.—Pottstown Division, comprising that portion of the main line from Port Richmond to water tank south of Eckert's Furnace, Reading, the Chester Valley Railroad, the Pickering Valley Railroad, and the Colebrookdale Railroad; Mr. I. E. Umstead, Division Engineer, office at Pottstown, Pa.

"3.—Reading Division, comprising that portion of the main line between water tank south of Eckert's Furnace, Reading, and the bridge north of the Reading coaling station, the Lebanon Valley Branch, the Steelton Branch, the West Reading Branch, the East Pennsylvania Railroad, the Allentown Railroad, and the Schuylkill & Lehigh Railroad; Mr. E. Chamberlain, Division Engineer, office at Reading, Pa.

"4.—Pine Grove Division, comprising the Schuylkill & Susquehanna Branch, the Lebanon & Tremont Branch, and the Mount Eagle Branch; Mr. W. G. Johnson, Division Engineer, office at Pine Grove, Pa.

"5.—Pottsville Division, comprising that portion of the main line from bridge above Reading coaling station, northward, that portion of the Little Schuylkill Railroad between Port Clinton and Broad street, Tamaqua, and all coal territory south of the crest line of the Broad Mountain, between Tamaqua and Tremont; Mr. P. A. Taylor, Division Engineer, office at Pottsville, Pa.

"6.—Mahanoy Division, comprising that portion of the Little Schuylkill Railroad between Broad street, Tamaqua, and Tamaqua, the Nesquehoning Valley Railroad, the East Mahanoy Railroad and all coal territory north of the crest line of the Broad Mountain, from Mahanoy City to Shamokin and Herndon; Mr. W. H. Dechant, Division Engineer, office at Mahanoy Plane, Pa.

"7.—Catawissa Division, comprising the Catawissa Railroad, the Trescow Railroad and the Shamokin, Sunbury & Lewisburg Railroad; Mr. W. G. Yetter, Division Engineer, office at Catawissa, Pa.

"8.—New Jersey Central Division, comprising the main line of the Central Railroad of New Jersey, from Jersey City to Phillipsburg, and its several branches, including the South Branch Railroad; Mr. W. H. Peddle, Division Engineer, office at Elizabeth N. J.

"9.—New Jersey Southern Division, comprising the main line of the New Jersey Southern Railroad and the Vineland Railroad, from Sandy Hook, to Bayside, with their several branches and extensions, also the New York & Atlantic Highlands Railroad; Mr. W. V. Clark, Division Engineer, office at Red Bank, N. J.

"10.—Lehigh & Susquehanna Division, comprising the Lehigh & Susquehanna Railroad and its several branches, excepting the Nesquehoning Valley Railroad and the Trescow Railroad; Mr. G. W. Twining, Division Engineer, office at Mauch Chunk, Pa."

*Sharon & State Line.*—Mr. George H. Taylor, of Sharon Pa., is President of this new company.

*Tavares, Orlando & Atlantic.*—This company, at its recent annual meeting, elected the following directors: W. R. Anno, A. St. Clair Abrams, N. Poyntz, T. J. Shine, Tavares, Fla.; J. H. Durkee, Jacksonville, Fla.; John A. Henderson, Tallahassee, Fla.; Lawrence I. Peck, Chicago; S. R. Adams, New York.

*Western & Atlantic.*—At the annual meeting in Atlanta, Ga., Feb. 5, the old directors were re-elected. The board subsequently re-elected Hon. Joseph E. Brown, President; W. C. Morrill, Vice-President, Secretary and Treasurer; R. A. Anderson, General Superintendent.

*Western General Freight Agents' Association.*—At a meeting held in Chicago, Feb. 5, the following officers were elected: President, E. B. Ripley; Vice-President, J. F. Goddard; Treasurer, George M. Bogue; Secretary, F. French.

*Wisconsin Central.*—Mr. H. C. Fuller has been appointed General Agent in Chicago in place of Daniel M. Boynton, deceased.

A circular issued from the office of General Manager Finney, announces that W. E. Carroll, having resigned the position of Superintendent of the Middle & Northern divisions and the Wisconsin & Minnesota railroads, the following appointments are made, to take effect Feb. 1, 1885: A. A. Allen's jurisdiction as Superintendent is extended over the line from Stevens Point to Ashland. G. T. Wiswell is appointed Superintendent of the Wisconsin & Minnesota Railroad, and of the Chippewa Falls & Western Railway, with headquarters at Chippewa Falls.

#### PERSONAL.

—Mr. F. D. Munson has resigned his position as Master of Transportation of the Memphis & Charleston road.

—Mr. J. B. Hastings has resigned his position as Superintendent of the Arkansas Division of the Texas & St. Louis road.

—Mr. C. Stickney has resigned his position as Assistant Treasurer and Paymaster of the Burlington, Cedar Rapids & Northern road.

—Mr. W. E. Carroll has resigned his position as Superintendent of the Middle and Northern divisions of the Wisconsin Central Railroad.

—Mr. Henry Villard has resigned his position as President of the Oregon & California Railroad Co., the last office which he retained in the companies of which he was formerly the head.

—It is understood that Mr. Roswell P. Miller, for some time past Assistant General Manager, will succeed the late Mr. Merrill as General Manager of the Chicago, Milwaukee & St. Paul road.

—Mr. C. E. Henderson has declined the office of General Manager of the Florida Railway & Navigation Co., preferring to retain his present position as General Manager of the Indiana, Bloomington & Western road.

—Mr. Sherburn S. Merrill, whose dangerous illness was mentioned last week, died very early on the morning of Feb. 8, having never rallied from the effects of the last paralytic stroke. A more extended notice of his life will be found elsewhere.

—Frank Eysman, one of the first conductors who served on the New York Central, died at Little Falls, N. Y., Feb. 2, aged 66 years. Conductor Eysman was on the road about 30 years, and was thoroughly conversant with its early history. He left the road some 10 years ago.

—Col. Frank C. White, who died in Bennington, Vt. last week, aged 60 years, was for 14 years Superintendent of the Rutland Railroad, and had previously served on that and other New England railroads in subordinate positions. He left the Rutland road some years ago to take charge of the Panama Railroad as General Superintendent, but returned to the United States last year on account of failing health.



—Hon. Joseph Grinnell, who died in New Bedford, Mass., Feb. 7, aged 93 years, was born in that town, but in 1809 went to New York, where he became a member of the shipping house of Fish, Grinnell & Co., well remembered by old New Yorkers. In 1830 he returned to New Bedford, and had ever since lived there. For a number of years he was President of the New Bedford & Taunton Railroad Co. and a director in the Boston & Providence Co. He served in Congress from 1833 to 1841.

—Mr. James H. Banker, for many years a well-known merchant and banker of New York city, died at his residence in Irvington, N. Y., Feb. 10, aged 53 years. Mr. Banker was for many years Vice-President of the Bank of New York, and was identified with financial affairs of considerable magnitude. He was an intimate friend of Commodore Vanderbilt and his son, and had served for a long time as a director in the New York Central, the Lake Shore, the Harlem and other Vanderbilt companies. He took an active share in the management of these companies and served on the executive committees of nearly all of them. He was also a director of the Western Union Telegraph Co., and took an active interest in the improvement of the telegraph service and also in electric light.

—Mr. R. M. Shoemaker died at his residence in Clifton, near Cincinnati, Feb. 10, aged 70 years. Mr. Shoemaker was born in Herkimer County, N. Y., but at an early age went West and settled in Cincinnati, where for many years he was identified with the growth and business of that city. He early took an interest in the building of railroads, and was prominently connected with nearly all the roads running into Cincinnati, having taken active part in the building of the Little Miami, the Cincinnati, Hamilton & Dayton, the Dayton & Michigan, the old Mad River & Lake Erie, the Kentucky Central and other lines. He was also for several years actively connected with the Kansas Pacific, and was at one time President of the St. Louis Bridge Co. He was an advocate of the construction of the Cincinnati Southern, and at one time was President of that road. For a number of years he was President of the Cincinnati Consolidated Street Railway Co. Some years ago he suffered from a stroke of paralysis and retired from active business. He leaves a considerable fortune.

### Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of January:	1885.	1884.	Inc. or Dec.	P. c.
Boston, Hoosac	\$32,222	\$25,843	I.	\$6,379 24.5
Bur. C. R. & N. O.	223,719	213,863	I.	9,856 4.6
Central Iowa	85,646	110,918	D.	-25,272 22.7
Central Pacific	1,842,000	1,449,785	I.	392,215 27.0
Chas. Col. & A.	80,500	65,375	I.	15,125 23.2
Chi. & East. Ill.	125,233	125,424	D.	-191 0.1
Chi. & North-west	1,498,100	1,592,418	D.	-94,318 6.3
Chi., St. P., M. & O.	331,700	350,609	D.	-18,909 5.7
Chi. & W. Mich.	73,942	105,427	D.	-31,485 29.9
Chi., Ind., St. & Chic.	200,427	170,318	I.	30,109 17.7
Col. & Greenville	72,300	56,645	I.	15,655 27.5
Denver & R. G.	390,401	399,586	D.	-9,185 2.3
Det., Lan. & No.	68,783	85,854	D.	-17,071 19.9
Flint & Pere Mar.	144,322	186,440	D.	-42,118 28.7
Georgia Pacific	60,528	46,052	I.	14,476 31.5
G. B. W. & St. P.	21,460	30,109	D.	-8,649 28.8
Ill. Central	885,300	836,572	I.	48,728 5.8
Iowa lines	104,300	131,512	D.	-27,212 20.6
Ind., Bloom. & W.	198,036	198,085	D.	-49 0.0
Louisv. & Nash.	1,165,735	1,039,317	I.	126,418 12.2
Mexican Central	318,300	199,976	I.	118,324 59.2
Mobile & Ohio	207,640	179,238	I.	28,402 15.8
Norfolk & West.	230,464	213,020	I.	17,444 8.2
Northern Pacific	556,092	614,103	D.	-58,011 9.4
Ohio Central	79,404	87,260	D.	-7,856 8.5
Ohio Southern	45,100	36,973	I.	8,126 21.9
Peoria, Dec. & E.	64,271	64,732	D.	-461 0.7
Rich. & Dan.	322,000	266,600	I.	55,400 20.8
Roch. & Pitts.	84,651	68,200	I.	16,451 24.2
St. L., Ft. Scott & Wichita	33,217	34,905	D.	-1,688 4.8
St. P. & Duluth	79,866	71,494	I.	8,372 11.7
St. P., M. & Man.	406,125	449,307	I.	-43,182 10.6
Shenandoah Val.	46,215	56,254	D.	-10,039 21.7
Western N. C.	39,863	28,455	I.	11,408 39.8

### Year ending Dec. 31:

1884.	1883.	Inc. or Dec.	P. c.
Chi., Mil. & St. P.	\$23,470,968	\$23,639,823	D. \$168,855 0.8
Net earnings	9,611,369	9,881,786	D. 270,417 2.8
Minn. & St. L.	1,828,833	1,822,875	I. 5,958 0.3
Mobile & Ohio	2,160,412	2,266,642	D. 106,230 4.7
Net earnings	586,777	762,499	D. 175,722 29.1
N. Y., L. Erie & Western	20,363,320	23,888,705	D. 3,525,385 17.3
Net earnings	12,613,305	10,149,050	I. 2,464,255 24.3
St. L. & San Fran.	5,372,654	3,422,592	I. 1,950,062 57.0
Net earnings	4,687,054	3,896,565	I. 790,489 20.3
Shenandoah Val.	2,255,968	2,073,436	I. 182,532 7.3
Net earnings	742,371	854,415	D. 112,044 15.2
Union Pacific	25,791,198	28,716,139	D. 2,924,941 10.5
Net earnings	11,776,740	13,658,456	D. 1,881,716 13.8

### Eleven months ending Nov. 30:

1884.	1883.	Inc. or Dec.	P. c.
Wab., St. L. & P.	\$15,247,967	\$15,390,175	D. \$142,208 0.9
Net earnings	2,802,883	3,210,105	D. 407,222 12.7

### Month of December:

1884.	1883.	Inc. or Dec.	P. c.
Louisv. & Nash.	\$1,289,127	\$1,272,924	I. \$16,203 1.5
Net earnings	606,749	492,429	I. 114,320 23.2
Minn. & St. L.	171,644	145,918	I. 25,726 17.6
Mobile & Ohio	284,637	280,246	D. 4,391 1.6
Net earnings	143,730	159,998	D. 16,268 10.2
N. Y., L. Erie & Western	1,570,385	1,823,568	D. 253,183 13.9
Net earnings	350,343	226,342	I. 124,001 54.0
Northern Pacific	758,229	856,184	D. 97,955 11.4
Net earnings	340,508	328,535	I. 11,973 3.6
Shenandoah Val.	53,882	63,338	D. 9,456 15.0
Net earnings	3,136	9,110	D. 5,974 65.6
Union Pacific	2,332,118	2,322,292	I. 9,826 0.4
Net earnings	1,174,908	871,302	I. 303,606 34.8

Weekly earnings are usually estimated in part, and are subject to correction by later statements.

### Transcontinental Association.

A meeting of the Executive Committee of this association was held in St. Louis, Feb. 5, the principal business being the appointment of officers. Mr. C. W. Smith, who was chosen Commissioner, has not yet given a final answer as to his acceptance. Mr. Shattuck, who was chosen one of the Board of Arbitrators, has declined to act, and a new appointment in his place was considered, but the result was not made public.

### Coal.

Anthracite coal tonnages for the month to Jan. 31, as given by the weekly reports of the companies, have been for eight years past:

Year.	Tons.	Year.	Tons.
1885	1,576,010	1881	1,819,921
1884	1,920,734	1880	1,681,541
1883	2,115,593	1879	1,820,060
1882	2,100,480	1878	1,399,548

The January tonnage this year is thus smaller than in any

year since 1878, and has been kept nearly down to the limit fixed by the agreement. The decrease from last year was 344,724 tons, or 17.9 per cent.

Bituminous coal tonnages reported for the month of January are:

	1885.	1884.	Inc. or Dec.	P. c.
Cumberland, all lines	149,505	148,282	I.	1,223 0.8
Huntingdon & Broad Top	12,571	18,136	D.	-5,565 30.9
Barclay R. R. & Coal Co.	21,499	32,085	D.	-10,586 33.1
Pennsylvania R. R.:				
Clearfield	258,021	248,157	I.	9,864 4.2
Westmoreland	103,347	113,244	D.	-9,897 8.8
Minor districts	134,498	108,797	D.	25,701 23.6
Total	880,041	728,701	D.	151,340 20.6

A general decrease is here shown except in the Clearfield and Cumberland districts, where the gains are slight.

Coke tonnages reported for the month of January are as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Southwest Penna. R. R.	147,894	191,81	D.	-43,917 22.7
Other districts Pa. R. R.	48,570	54,148	D.	-5,578 8.6
Connellsville, via P. R. R.	10,019	24,589	D.	-14,570 59.6
Total	206,483	269,918	D.	-63,435 23.5

The coke traffic is now restricted to a considerable extent by the pool formed by the producers.

The coal tonnage of the Pennsylvania Railroad Division of the Pennsylvania Railroad for the year 1884 was:

Originating on the line of Division:	Coal.	Coke.	Total.
Snow shoe	183,271	23,431	206,702
Karthaus	57,864	—	57,864
Tyone & Clearfield	3,152,522	—	3,152,522
Gallitzin & Mountain	409,643	140,200	549,843
West Pennsylvania Railroad	285,405	23,590	308,995
Southwest Penna. Railroad	123,324	2,064,642	2,187,966
Westmoreland Region	1,320,186	215,680	1,535,866
Monongahela	158,635	70,694	229,329
Pittsburgh	269,085	136	269,221
N. & W. Branch, anthracite	955,811	—	955,811
Sunbury, Hazleton & Wilkes-Barre, anthracite	254,630	—	254,630
Total, line of road	7,170,666	2,538,382	9,709,048

Originating off the line of Division:

	1885.	1884.	Inc. or Dec.	P. c.
Anthracite	2,394,921	—	I.	2,394,921
Semi-bituminous	888,628	307,744	I.	580,884 65.4
Total for year	10,454,215	2,846,126	I.	7,608,089 267.3

The increase for the year was: Line of road, 350,342; received from other lines, 524,111; total increase, 874,453 tons, or 7.1 per cent.

Actual tonnage passing over the Pennsylvania & New York road for the two months of its fiscal year from Dec. 1 to Jan. 31 was:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Anthracite	179,328	173,943	I.	5,385 3.1
Bituminous	40,065	42,321	D.	-2,256 5.4
Total	219,393	216,264	I.	3,129 1.4

The coal tonnage of the Pennsylvania Railroad for the month ending Jan. 31 was:

	1885.	1884.	Inc. or Dec.	P. c.
Coal	781,589	876,903	D.	-95,314 10.9
Coke	179,396	254,405	D.	-75,009 29.5
Total	960,985	1,131,308	D.	-170,323 15.1

This includes all coal and coke carried, whether originating on the line or received from other roads.

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for January was:

	1885.	1884.	Inc. or Dec.	P. c.
Coal Port, for shipment	43,663	38,203	I.	5,460 14.3
S. Amboy	50,658	68,331	D.	-17,673 34.7
Local points on N. J. divs.	18,589	20,049	D.	-1,460 7.8
Co.'s use	118,910	126,583	D.	-7,673 6.1

Of the total this year, 88,824 tons were from the Lehigh region and 30,086 tons from the Wyoming region.

The Tennessee Commissioner reports that the total output of coal in that state last year was 709,604 tons, against 513,980 tons in 1883; an increase of 195,624 tons, or 38.1 per cent. This coal is chiefly mined in East Tennessee.

Shipments of coal and coke on the Monongahela Improvement Co.'s works, from the mines on the Monongahela River above Pittsburgh, for the year ending Dec. 31 were, in bushels:

	1884.	1883.	Inc. or Dec.	P. c.
Coal	79,760,100	108,487,800	D.	-28,727,700 26.5
Coke	2,437,732	3,907,589	D.	-1,469,857 37.6
Total, bushels	82,200,832	112,395,389	D.	-30,194,557 26.9

Cumberland coal shipments for the week ending Feb. 7 were 32,937 tons; total shipments to Feb. 7 this year, 182,442; last year, 174,779; increase, 7,663 tons, or 4.4 per cent.

### Cotton.

Cotton movement for the week ending Feb. 6 is reported as follows, in bales:

	1885.	1884.	Inc. or Dec.	P. c.
Receipts	43,663	93,160	D.	-49,497 53.2
Shipments	52,745	80,448	D.	-27,703 34.5
Stock, Feb. 6	271,790	282,475	D.	-10,685 3.8

Receipts

	1885.	1884.	Inc. or Dec.	P. c.
Receipts	89,785	111,481	D.	-21,696 19.3
Exports	93,658	119,383	D.	-25,725 21.6
Stock, Feb. 6	869,062	1,043,772	D.	-174,710 16.9

The total movement from plantations for the cotton year (from Sept. 1) to Feb. 6 is estimated at 5,057,830 bales; the increase, as compared with last year, is 137,043 bales, the decrease from 1882-83 is 387,404 bales, and the increase over 1881-82 is 386,132 bales. The weather for the week was generally favorable to a free movement.

### Southern Railway & Steamship Association.

Receiver Fink, of the East Tennessee, Virginia & Georgia road, has notified General Commissioner Powers that that road will withdraw from the pools of this Association. The reason given by Major Fink is that his road is now under control of the United States Circuit Court, and that Court will not permit him to become or remain a party in any pooling contracts. The effect of this action may be to break up the Association; but it is also possible that the other roads may unite against the East Tennessee.

### Southern Freight Rates.

The war on freight rates to Chattanooga, Tenn., has come to an end, a friendly adjustment having been reached at a meeting held in Chattanooga Feb. 6. The principal parties were the Memphis & Charleston and the Nashville, Chattanooga & St. Louis, and the rate from Chattanooga to Memphis has been cut down to 5c. per 100 lbs. The rates will now be restored to the tariff in force before the contest began.

### Trunk Line Meeting.

At the meeting of the trunk line Presidents, held in New York Feb. 6, the Pennsylvania, the New York Central, the Erie, the Baltimore & Ohio and the Grand Trunk were represented. It was unanimously resolved to request Commissioner Fink to withdraw his resignation, and as he declined to do so, it was finally laid over and not accepted. After a long discussion it was voted unanimously not to

suspend the pooling contract, but to continue it in force for the present. It was also resolved to continue the east-bound pool until April 1, at which date the withdrawal of the Grand Trunk will take effect. Nothing was done in relation to passenger business. Another meeting will be held shortly.

### Chicago-Ohio River Pool.

At a meeting held in Chicago, Feb. 4, the Executive Committee of the roads in this pool agreed upon percentages in the various subordinate pools as follows:

Freight:	C. I. St. L. & Chi.	Chi. St. L. & N.	Chi. St. L. & C. & E. I.	C. H. & D.	J. M. & D.
Chicago-Indianapolis	48	17 1/2	16	18 1/2	—
Chicago-Louisville	15	41	41	3	—
Chicago-Cincinnati	59	22	5	4	10
Indianapolis-Cincinnati	70	—	—	—	30
Indianapolis-Louisville	18	—	—	—	82

Passenger:	C. I. St. L. & Chi.	Chi. St. L. & N.	Chi. St. L. & C. & E. I.	C. H. & D.	J. M. & D.
Chicago-Indianapolis	50	17	16	17	—
Chicago-Louisville	7	45	45	3	—
Chicago-Cincinnati	60	20	5	4	11
Indianapolis-Cincinnati	75	—	—	—	25
Indianapolis-Louisville	10	—	—	—	90

It was resolved that the offices of the Commissioner and the Executive Committee be removed from Chicago to Indianapolis.

### Passenger Notes.

The Louisville & Nashville announces that the privilege of stopping over, not to exceed 10 days, will be given to all passengers going to the New Orleans Exhibition on its special excursion tickets. The stop-over can be made only on the way to New Orleans and not on the return trip.

The first train from Charleston to New Orleans, on which passengers are to be carried to the Exhibition at a uniform rate of 1 cent per mile, left Charleston Feb. 9 and arrived at New Orleans on the following evening. The train runs over the Charleston & Savannah, the Savannah, Florida & Western, the Pensacola & Atlantic and the Louisville & Nashville roads.

### RAILROAD LAW.



Swann & Co., of New York, a loan of \$450,000, and that work will be begun at once on the extension of the line from Hendersonville, N. C., to Asheville, 30 miles.

**Augusta, Gibson & Sandersville.**—At the annual meeting, in Augusta, Ga., Feb. 3, the stockholders voted to authorize the issue of \$350,000 in bonds to complete the road. The President stated that he had already received an offer to take these bonds at a fair price. The road is to run from Augusta, Ga., to Sandersville, 78 miles. A considerable part of the grading is finished, and the track is laid from Augusta to Graceville, 10 miles.

**Boston & Maine.**—Reports that this company was negotiating for a lease of the New Brunswick Railway are stated by the officers of the company to be entirely without foundation.

This company invites proposals until Feb. 18 for \$600,000 twenty-year 4 per cent. improvement bonds, issued under the provisions of the lease of the Eastern to the Boston & Maine. Interest is to be payable semi-annually, Aug. 2 and Feb. 2, and the subscription and accrued interest will be due Feb. 25. The bonds will be plain, but with sinking fund provisions, the interest and 1½ per cent. of the principal per annum to be charged as operating expenses.

**Boulder & Denver Air Line.**—This company has been organized to build a railroad from Denver, Col., by way of Buffalo Hill to the Marshall coal mine. It is an independent enterprise intended for local purposes entirely. The distance by the projected line from Denver to Marshall is 23 miles; to Boulder, 28 miles.

**Bradford, Eldred & Cuba.**—The Metropolitan Trust Co. of New York, trustee under the first mortgage of this road, has begun suit to foreclose, and the New York Supreme Court has appointed a receiver pending the suit. The road is a narrow gauge line, extending from Cuba, N. Y., on the Erie road, to the Pennsylvania line, 24 miles, and the company operates under lease the Bradford, Richburg & Cuba, which extends it to Eldred, Pa., 9 miles, and the Wellsville, Bolivar & Eldred road, 21 miles long. The first mortgage amounts to \$500,000, and default was made on the interest Jan. 1 last. There is also a second mortgage under which \$60,000 in bonds have been issued. The road has been controlled by the New York, Lake Erie & Western Co. and has been operated in the interests of that company. It is one of the numerous narrow-gauge lines which were built to serve the Alleghany oil district in New York and the Bradford district in Pennsylvania.

**Buena Vista.**—The last rail on this road was laid Feb. 9, and regular trains will soon begin to run. The road extends from Anderson, Ga., on the Southwestern Division of the Central Railroad of Georgia, westward to the town of Buena Vista, 26 miles.

**Buffalo, New York & Philadelphia.**—At a meeting of large holders of the stock in Philadelphia a committee was appointed to send out a circular to stockholders generally, urging them to pay their assessments and take the \$1,500,000 general mortgage bonds offered them. It was stated that the bondholders will generally fund their coupons as proposed by the company, provided these bonds are taken and the floating debt funded. The time for payment has been extended to June 1, and if matters are not arranged by that time there will most certainly be a foreclosure.

**Burlington, Cedar Rapids & Northern.**—This company's statement for the year ending Dec. 31 shows earnings as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Earnings .....	\$2,796,459	\$2,846,772	D. \$50,313	1.8
Expenses .....	1,917,769	1,968,177	D. 50,408	2.5
Net earnings .....	\$878,690	\$878,595	I. \$95	...
Per cent. of exps. ...	68.6	69.1	D. 0.5	...

The new road built by the company in 1884 was not completed or opened for traffic until very near the close of the year, and was operated too short a time to affect the earnings of the year to any considerable extent.

**Burlington & Northwestern.**—The round-house and repair shops of this company at Burlington, Ia., were destroyed by fire Feb. 8, and three engines were either destroyed or badly damaged. The loss is a serious one to the road, as it is deprived of a large part of its motive power.

**Chicago & Eastern Illinois.**—The following statement of the income and fixed charges of this company in successive periods has been issued by Chase & Higginson, of No. 24 Pine street, New York:

	Net earn.	Int. paid on bonds.	Int. paid on Div. bonds.	Surplus.
Aug. 31, 1879 .....	\$302,397	\$180,000	.....	\$122,397
" " 1880 .....	304,044	180,000	.....	124,044
10 mos. to June 30, 1881 .....	338,011	154,250	\$50,616	133,145
Year to June 30, 1882 .....	493,890	180,000	26,838	\$287,052
" " 1883 .....	570,323	180,000	53,774	336,549
" " 1884 .....	474,200	180,000	53,781	240,419

The statement adds that for the last half of 1884 the company earned a trifle over 3 per cent. on the stock after paying all charges for interest, etc. All the profits over fixed charges, except \$90,000 paid in dividends in 1882, have been expended for the improvement of the road and additions to its equipment; and these expenditures made out of income amount to \$1,000,000, besides \$200,000 provided by sales of bonds and \$550,000 represented by the floating debt. The net earnings thus applied to construction were sufficient to pay 37 per cent. on the \$3,000,000 capital stock.

**Cleveland & Marietta.**—On application of the bondholders and other creditors, the Court of Common Pleas of Washington County, O., has appointed a Receiver for this road. The road extends from Marietta, O., to Canal Dover, 99 miles, and by the last statement it had \$1,000,000 first mortgage bonds and a floating debt of \$200,000. It was formerly known as the Marietta, Pittsburgh & Cleveland, and was sold under foreclosure in 1877, when the present company was organized. It has been, for some time past, operated in connection with the Wheeling & Lake Erie road and under the management of the same officers. It is owned chiefly by Commodore Garrison, of New York.

**Cleveland, Youngstown & Pittsburgh.**—The Court has authorized Mr. Robert Martin, Receiver of this road, to issue certificates to the amount of \$25,000 for the purpose of buying a locomotive and passenger car, and making certain improvements on the road. The road runs from Minerva, O., to Phalanx, 41½ miles, and has been in the hands of a receiver for some time.

**Connecticut Railroad Legislation.**—A bill is pending in the Connecticut Legislature which provides that no railroad company in that state which pays 8 per cent. dividends on its stock shall charge more than 2½ cents per mile

\*Also \$15,180 for other interest. †Also \$13,863 for discounts, etc. ‡Also \$21,287 for discounts, etc.

for passengers, and no company which pays 10 per cent. shall charge more than 2 cents per mile. This bill is, of course, intended to affect chiefly the New York, New Haven & Hartford road, and meets with strong support in the Legislature.

**Dakota Midland.**—The first annual report of this company states that in the spring of 1884 active operations were begun in surveying and locating the line. It was expected that 50 miles of grading would be completed during the year, but from financial reasons this could not be done. Arrangements have now been made for placing mortgage bonds upon the road, which will, the company expects, enable it to begin construction early in the spring and to complete the line from Allendale, Dak., eastward to Campbell, Minn., 105 miles, in the course of the year. This division of the road has been located, showing a very easy line with a maximum grade of 30 ft. to the mile and no heavy work. The company has secured the right of way for 75 miles, and in addition to this valuable land for town sites, as well as depot grounds in towns already established. Most of the right of way has been given by the people along the line. The grading already done is about 11½ miles.

The liabilities of the company consist of \$500,000 capital stock and \$13,440 accounts and notes payable. The property and lands acquired are given in the accounts at \$336,824; cash and accounts due, \$2,216, and the company also has \$174,400 of its stock in the treasury. Arrangements have been made for the issue of first mortgage bonds to the amount of \$15,000 per mile of road, these bonds to draw 6 per cent. interest and have 30 years to run. The mortgage to secure these bonds has been made to the Farmers' Loan & Trust Co. of New York as trustee.

**Delaware & Hudson Canal Co.**—This company's quarterly statement for its leased lines in New York for the quarter ending Dec. 31 is as follows:

	Albany & Sus.	Rens. & Sara.	N. Y. & Can.
Earnings .....	\$572,232	\$496,810	\$158,117
Expenses .....	409,225	269,012	97,991
Net earnings .....	\$163,007	\$227,798	\$60,126
Other income .....	.....	9,545	.....
Total .....	\$163,007	\$237,343	\$60,126
Charges .....	274,712	250,864	78,920
Deficit .....	\$111,705	\$13,521	\$18,794

The total deficit on the three lines was \$144,020 for the quarter. This is, however, usually the worst period of the year on these roads.

**Denver & Rio Grande.**—The report of the London bondholders' committee, which has recently been submitted, agrees substantially with that of Mr. Fleming, who represented the Scotch bondholders, and whose report was made some time ago. The members of the committee have studied the condition of the road and its prospects carefully, and express their opinion without reference to the present depressed condition of business. They say that, after providing for prior liens, including interest on rolling stock certificates, the net earnings are equivalent to about 4 per cent. on the consolidated bonds, and the limit of safety must therefore be below that. They recommend that the present consolidated bonds be exchanged for new bonds bearing only 3½ per cent. interest, and as compensation to the bondholders the issue of an amount of preferred stock carrying such rate of dividends as will insure to them their full 7 per cent. interest if earned. They also recommend that a sufficient amount of bonds should be created, but kept in reserve under very strict provisions, as they are to be issued to provide for the future capital requirements of the company. It will also, they say, be necessary to capitalize the rolling stock trusts on equitable terms. The money necessary for immediate improvements it is proposed to raise upon assessment on the stock owners, the amount to be represented by preferred stock.

**Denver & Rio Grande Western.**—A statement of the operations of this company from July 12, 1884, when the lease was abandoned, to Dec. 31, is as follows: Gross earnings, \$490,396; operating expenses, \$361,384; net earnings, \$129,012. Deduct taxes, rental and equipment, \$32,364; leaving a balance, expended and being expended on betterments, of \$96,647. It thus appears that in the extreme depression of 1884, and under the least favorable circumstances as to operations, this company earned about one-half the current interest on its bonds.

**Durango, Fort Lewis & Western.**—This company has been organized to build a railroad from Durango, Col., by way of Fort Lewis, to Rico, the object being to connect several mining towns in that region.

**Greenwood, Laurens & Spartanburg.**—This road is now completed from Greenwood, S. C., the terminus of the Augusta & Knoxville road, northward 28 miles to Laurens. It was opened for traffic Feb. 9. The stations on the line, with the distances from Greenwood are: Coronado, 8; Waterloo, 15; High Point, 20; Maddins, 24; Laurens, 28 miles. Work is to be pushed on the grading of the extension from Laurens to Spartanburg, about 35 miles.

**Hannibal & St. Joseph.**—The \$3,000,000 consolidated bonds offered by this company have been taken by Kuhn, Loeb & Co., of New York, who take the entire issue. The price is reported to be 110. They are 6 per cent. bonds, and, as said last week, are to be used to retire the convertible bonds due March 1. They are issued under the consolidated mortgage for \$8,000,000, in which provision was made for retiring all prior issues.

**Highland Junction.**—This company has made application to the Massachusetts Legislature for assistance in building its projected bridge over the Hudson River. The application is made on the ground that the construction of the road will be of very great advantage to the state of Massachusetts. The Legislature is asked to guarantee the interest on \$5,000,000 bonds of the company.

**International, of Maine.**—It is said that the fight over this company's application to the Maine Legislature for a change of route will be ended by a compromise. Instead of bridging Moosehead Lake and building its own line to Bangor, the plan proposed is that the new road shall connect with the Bangor & Piscataquis road at the lake and use the tracks of that road to Bangor. This compromise will remove all the objections which came from Bangor, and which were made on the ground that the new line would take away much of the business of the Piscataquis road.

**Kansas & Gulf Short Line.**—Mr. E. B. Stevenson, General Freight and Passenger Agent of this road, writes as follows under date of Feb. 7: "This company has just let contract for constructing 23 miles of road south of its present terminus to a connection with the Houston, East & West Texas road, at or near Lufkin, Texas. About 400 men will be employed on construction within 15 days and the road completed in five months. The completion of this line will effect important connections, making a continuous narrow-gauge system from St. Louis to Houston."

**Lake Erie & Western.**—The Lake Erie & Mississippi Co., which was recently organized to build a railroad from

Bloomington, Ill., to Peoria, is to be consolidated with this company, of whose road the new line is to be an extension.

**Little Rock & Fort Smith.**—This company makes the following statement for December and the year ending Dec. 31:

	December.	Year.
Earnings .....	\$76,512	\$589,071
Expenses .....	30,614	343,480
Net earnings .....	\$39,898	\$245,592

The net increase for December was \$3,021, or 8.2 per cent.; for the year, \$2,286, or 0.9 per cent.

**Louisville, Evansville & St. Louis.**—At a meeting of the Western bondholders and creditors in St. Louis last week Messrs. St. John Boyle and J. M. Fetter were appointed a committee to represent them and to co-operate with the Boston committee in relation to the reorganization of the road.

**Louisville & Nashville.**—This company's statement for December and the six months of its fiscal year from July 1 to Dec. 31 is as follows:

	Gross earnings.	Net earnings.
	1884.	1883.
July .....	\$1,066,100	\$1,124,776
August .....	1,117,313	1,251,127
September .....	1,145,360	1,334,179
October .....	1,291,714	1,504,465
November .....	1,199,596	1,307,394
December .....	1,292,127	1,272,924
Total 6 mos. ....	\$7,106,220	\$7,794,865

For the six months the decrease in gross earnings was \$688,645, or 8.8 per cent.; in net earnings, \$100,163, or 3.1 per cent. In December there was a slight gain in net and a large one in gross earnings.

**Memphis, Selma & Brunswick.**—The contractors for the completion of this road, Dunavant & Kelly, have now a large force employed on the line. The work of clearing out and putting in order the 20 miles of track which was laid from Holly Springs, Miss., westward two years ago, is well advanced, and a large force is employed on the unfinished grading. Track laying was begun recently at McGee, Tenn., and, at last reports, 4 miles had been laid. The steel rails have either been received or are on the way. The distance from Memphis to Holly Springs is 46 miles.

**Mexican Railroad Notes.**—The following notes are from the *Mexican Financier* of Jan. 31:

The last two steamers arriving at Merida, Yucatan, from Europe brought a large quantity of rails and other material for the construction of the railroad from Merida to Izamal, superintended by Mr. José Rendón Peniche. This road, which passes through Motul, will join the eastern and coast districts of the state to its capital and the port of Progreso.

The Wells Fargo Express Co. has arranged with the Mexican Railway Co. for the extension of its express system to Vera Cruz, Puebla, Jalapa and intermediate points. Next to railway, postal and telegraph facilities, a reliable express service is the most important agent in aiding commercial transactions. The arrangement, therefore, for supplying this much-desired service over the oldest route of commerce in the country will be very welcome to the merchants of the cities thus to be benefited.

**Minnesota & Northwestern.**—The St. Paul (Minn.) *Pioneer Press* says: "So far as weather conditions permit, work is progressing on the Minnesota & Northwestern Railroad. The work is graded 100 miles to Mouna. The rails are on the ground ready to be laid after the snow disappears and other conditions are favorable. There is some work being done now in digging cuts along the line. It is expected the road will be completed in 60 days after the beginning of settled weather, and that the bridge between St. Paul and the West side will be finished in June. This bridge is to extend from the foot of Custer street, West St. Paul, to a point a little below Robert street. There are now being put in four fixed spans of 225 ft. each, with a dr w span of a little more than 400 ft. over the channel of the river. The bridge will have stone piers and iron superstructure. Length of bridge 1,400 ft.; cost, \$250,000. All the foundations are now in, and the masonry is started. The contract for the piers has been let to Sherwood & Co., and Lauer Bros. of St. Paul are the contractors for the stone work. There will be in all six or seven piers, to be constructed of Red Wing limestone, with granite nosings. The superstructure will be built by the construction force of the railroad. At West St. Paul an artesian well is being sunk, near Eaton avenue. It is now 100 ft. in depth, which will be extended to secure a steady flow of the water that was reached some time ago. Along the line tank work is being done. Contracts have been let to the Passaic Bridge Co., of Paterson, N. J., for iron spans, one to be placed across the Cannon River at Cascade, two across the Cedar River at Austin, and one at Rose Creek, south of Austin, each being 180 ft. in length. All are to be ready in 60 days. The contracts for rolling stock are being carried out, and 100 flat cars and four locomotives are ready now for delivery. It is stated, on good authority, that although the new road connects at Mouna, Ia., with the Illinois Central, the latter company has no investment in the Minnesota & Northwestern, and that the latter is entirely independent in its sphere."

**Mobile & Ohio.**—The following statement is made for December and the six months of the fiscal year from July 1 to Dec. 31:

	December.	Half-year.
	1884.	1883.
Earnings .....	\$284,637	\$289,246
Expenses .....	140,907	129,248
Net earn. ....	\$143,730	\$159,998
P. c. of exps. ....	49.5	44.5

For the half-year the gross earnings decrease \$108,503, or 8.4 per cent., and the expenses increased \$26,168, or 3.4 per cent.; the result being a decrease of \$134,671, or 25.7 per cent., in net earnings.

**New York Central & Hudson River.**—This company's statement for the quarter ending Dec. 31, the first quarter of its fiscal year, is as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Earnings .....	\$6,810,170	\$7,814,128	D. \$1,003,958	13.9
Expenses .....	3,933,086	4,081,799	D. 148,713	15.8
Net earnings .....	\$2,877,084	\$3,732,329	D. \$855,245	11.0
Interest, rentals and state tax .....	1,500,000	1,395,000	I. 105,000	7.6
Surplus .....	\$1,377,084	\$1,837,329	D. \$460,245	25.1
Dividend paid .....	1,341,425	1,788,566	D. 447,141	25.0
Balance .....	\$35,659	\$48,763	D. \$13,104	26.7

Expenses were 57.74 per cent. in 1884, against 59.15 in 1883. The surplus last quarter was 1.54 per cent. on the stock; the dividend was 1½ per cent. In 1883 the dividend was 2 per cent. The statement says:

"In the current quarter the amounts received and paid for car mileage are not included in earnings and expenses respectively, as last year, but the excess of payments over receipts,



being the debit balance in the account, has been charged to operating expenses."

The balance sheet Dec. 31 is as follows:

Liabilities:	
Capital stock.....	\$89,428,300
Funded debt.....	56,497,333
Bonds and mortgages on real estate.....	109,320
Past due bonds.....	12,855
Interest on funded debt accrued.....	1,514,527
Dividends unpaid.....	6,979
Due for wages, supplies, etc.....	51,522
Due for other roads, etc.....	2,263,360
Profit and loss (excess assets over liabilities).....	1,713,622
Total.....	\$164,345,621
Assets:	
Cost of road and equipment.....	\$145,981,846
Stock and bonds of other companies.....	3,409,821
Ownership in other lines, real estate, etc.....	6,336,013
Due by agents and others.....	3,896,816
Supplies on hand, Sept. 30, 1884.....	1,383,362
Harlem construction account.....	61,697
Equipment Harlem line.....	404,394
Taxes paid over p'p'n charged in this quarter.....	490,917
Cash on hand.....	2,371,755
Total.....	\$164,345,621

As compared with the balance sheet in the annual report (Sept. 30) there was no change in stock or funded debt. The floating debt, including current balances, has increased \$860,165; cash on hand has increased \$880,534 during the quarter.

**New York, Chicago & St. Louis.**—Wall street reports are either that a default will be made on the first mortgage bonds of this company shortly, or that the bondholders will be asked to consent to a reduction of interest. These rumors cannot be verified.

**New York, Lake Erie & Western.**—This company makes the following statement for December and the three months of its fiscal year from Oct. 1 to Dec. 31, the figures including 68 per cent. of the gross earnings and all the working expenses of the leased New York, Pennsylvania & Ohio road:

December.		Three months.	
1884.	1883.	1884.	1883.
Earnings.....	\$1,570,385	\$1,823,598	\$5,415,696
Expenses.....	1,220,041	1,597,225	3,675,570
Net earnings.....	\$350,344	\$226,373	\$1,740,126

For the three months the decrease in gross earnings was \$1,274,116, or 19.9 per cent.; in net earnings, \$306,779, or 17.3 per cent.

The following statement gives the earnings of the Erie lines proper, excluding all earnings and expenses of the leased road:

December.		Three months.	
1884.	1883.	1884.	1883.
Earnings.....	\$1,362,719	\$1,462,924	\$4,145,397
Expenses.....	927,706	1,185,621	2,779,484
Net earnings.....	\$435,013	\$277,303	\$1,365,913
P. c. of exps.....	73.5	81.7	67.1

For the three months there was a decrease in gross earnings of \$1,077,167, or 20.6 per cent.; a decrease in expenses of \$870,096, or 19.4 per cent., and a resulting decrease in net earnings of \$407,071, or 29.9 per cent.

Comparing the two statements, it is seen that the 68 per cent. of the gross earnings of the New York, Pennsylvania & Ohio road for the quarter this year amounted to \$996,183, while the expenses of that road were \$896,086, showing a gain of \$100,097 on the lease for the three months.

**New York & New England.**—This company has applied to the Connecticut Legislature for an adjustment of the claim of the state for taxes, which now amount to about \$170,000. The company claims that the road has been taxed over its true value and petitions the Legislature to make a considerable reduction.

**New York, New Haven & Hartford.**—This company's statement for the quarter ending Dec. 31 is as follows:

December.		Three months.	
1884.	1883.	1884.	1883.
Earnings.....	\$1,656,245	\$1,712,312	\$5,067,067
Expenses.....	1,162,060	1,181,035	3,488,975
Net earnings.....	\$554,185	\$531,277	\$1,578,092
Other receipts.....	3,528	8,061	4,533
Total income.....	\$557,713	\$539,338	\$1,582,625
Interest, rentals, etc.....	204,947	.....	.....
Surplus.....	\$352,766	.....	.....

The surplus this year was equal to about 2½ per cent. on the stock. The quarter is that of lightest earnings on this road.

**New York, Ontario & Western.**—The company gave notice that subscriptions would be received on and after Feb. 2, and until Feb. 28, for any or all of \$2,000,000 of the new first mortgage bonds at 90 and accrued interest. The bonds are of the denomination of \$1,000 each; principal payable Sept. 1, 1914, with interest at 6 per cent. per annum, payable March 1 and Sept. 1, redeemable, however, upon notice, at \$1,100 and accrued interest. The bonds are part of an issue secured by a mortgage which is a first and only lien upon the property now owned by the company, and such as may be hereafter acquired, executed, with the assent of a majority of the stockholders of each class, to the Mercantile Trust Co., as trustee.

The mortgage limits the entire issue to \$4,000,000, and provides that \$2,000,000 thereof shall be used for payment of floating debts and for other purposes of the company, but that the remaining \$2,000,000 shall be issued for no other purpose than to retire the preferred 6 per cent. stock of the company, or to cancel the preference given such stock over the common stock. The first-mentioned \$2,000,000 bonds are those now offered for sale, while those last-mentioned are held by the Farmers' Loan & Trust Co., as trustee, for the sole and special purpose named in the mortgage.

The proceeds of the \$2,000,000 of bonds now offered are to be applied to the payment of the current indebtedness of the company, which now amounts to about \$1,600,000, and to the improvement of its property. This indebtedness was incurred for equipment and improvement of the company's property, and in the extension of the line to New York.

The mortgaged property consists of the railroad, equipment, interest on the lease of West Shore, and joint interest with West Shore in the terminal property.

**Northern Pacific.**—This company's statement for December and the six months of its fiscal year from July 1 to Dec. 31 is as follows:

December.		Half-year.	
1884.	1883.	1884.	1883.
Earnings.....	\$758,229	\$856,184	\$6,627,719
Expenses.....	417,721	527,649	3,268,150
Net earnings.....	\$340,508	\$328,535	\$3,359,569
Rentals and guarantees on branches.....	.....	.....	390,003
Taxes.....	.....	.....	158,825
Interest and sinking funds.....	.....	.....	2,111,455
Total charges.....	.....	.....	\$2,660,283
Surplus for the half-year.....	.....	.....	\$699,286

For the half-year the gross earnings increased \$9,729, or

0.15 per cent., and the expenses decreased \$428,564, or 11.6 per cent., leaving a gain of \$438,293, or 15.1 per cent., in net earnings. The charges were not given by months in last year's report, so that no comparisons can be made. The total funded debt (including dividend certificates) on Dec. 31 was \$69,536,221, an increase of \$3,260,000 during the half-year. It is stated that there is now no floating debt, the \$3,000,000 second mortgage bonds recently sold having provided for that.

The land sales for the half-year were 158,011 acres, for \$791,808. The receipts on land accounts in cash were \$237,215; in bonds and preferred stock, \$629,303. The land notes held on Dec. 31 were \$3,040,933. The preferred stock canceled was \$551,503 for the half-year.

**Ogdensburg & Lake Champlain.**—In the suit brought by some of the Boston holders of income bonds, to enjoin this company from paying interest under its guarantee of the Lamolite Valley Extension bonds, the Court has granted a temporary injunction against such payment, pending further hearing in the suit. The amount of these bonds outstanding is \$350,000, and half of them are owned by the New York Central Co. The Extension road was built to provide a connection between this road and the St. Johnsbury & Lake Champlain.

**Ohio Central.**—The properties of the Ohio Central Coal Company are to be sold, under foreclosure of the mortgages, Feb. 19.

The Ohio Central Railroad committee are considering a new scheme of reorganization, upon which it is hoped that all interests can unite. Orders for the foreclosure sale of the Ohio Central Railroad were issued on Feb. 4, to be advertised 60 days. The terminal property in Toledo will be sold separately from the main line of road.

**Oregon Improvement Co.**—This company makes the following statement for December, the first month of its fiscal year:

December.		Three months.	
1884.	1883.	1884.	1883.
Earnings.....	\$228,192	\$271,478	\$43,286
Expenses.....	184,494	211,622	27,128
Net earnings.....	\$43,698	\$59,856	\$16,158

This statement covers all the company's operations, the railroad, steamship and land departments.

**Ottawa, St. Lawrence & Schenectady.**—This company has been organized to build a railroad from Schenectady, N. Y., to a point on the St. Lawrence River, near Canton, a distance of about 190 miles. The projected line is to be built very nearly on the old survey made nearly 20 years ago by the Schenectady & Ogdensburg Co., and the new company proposes to acquire such rights of the old corporation as may be still in existence.

**Oxford & Clarksville.**—A company has been organized to build a railroad from Oxford, N. C., the terminus of a branch of the Raleigh & Gaston road, northward to Keyesville, Va., the terminus of the Richmond & Mecklenburg road. The supposed line will pass through a rich country largely devoted to tobacco raising.

**Pennsylvania.**—In the United States Circuit Court in Philadelphia, Feb. 10, argument was heard on the petition of this company for leave to proceed to condemn certain lands belonging to the Philadelphia & Reading Co., and which are needed for the construction of the Schuylkill Valley Branch into the city of Reading. The Receivers of the Reading road put in an answer stating that the land which it is proposed to condemn is not necessary for the purposes of the new road, and also stating that the question of the right to condemn the land is now pending in the State Supreme Court. After hearing the arguments, the Court said that the right of the company to condemn land should be decided by the state court before the land was entered upon, and the petition was therefore granted on the condition that the land should not be taken until a decision was had on this question.

**Philadelphia & Erie.**—At the annual meeting in Philadelphia, Feb. 9, a plan was proposed and approved for an adjustment of the indebtedness of the company to the Pennsylvania Railroad Co., lessee. That company now holds about \$1,500,000 coupons on the Philadelphia & Erie bonds, for which it has advanced the money, and there is also due it about \$960,000 for interest on special stock. It is proposed to issue 4½ per cent. debenture bonds for the unpaid coupons, and to settle the interest of the special stock by the issue of common stock at par. The rate of interest on the special stock is to be reduced from 8 to 7 per cent., and it is to be made non-cumulative hereafter.

**Philadelphia & Reading.**—Signatures to the plan of reorganization have been secured from a number of the large holders of bonds in Philadelphia, including several of the banks and insurance companies. It now appears probable that this plan will secure the co-operation of a large majority of the creditors.

In Philadelphia, Feb. 6, the Receivers presented a petition to the Court asking authority to make an arrangement by which income bonds may be exchanged for the convertible scrip now outstanding, in accordance with the original agreement. The Receivers represent that most of the holders are willing to accept the exchange and that the arrangement will put a stop to litigation.

The Receivers also petitioned the Court for authority to make necessary payments of principal and interest on the car trust, which was created a year ago. The payments due on this account Feb. 15 are \$54,000 for interest and \$200,000 on account of the principal, besides \$2,000 for the yearly compensation of the Trustees.

At the office of the Special Master, in Philadelphia, Feb. 8, testimony was taken regarding the Receivers' petition to the Court for permission to pay the rentals on certain of the leased lines. The secretary of the company was the first witness called, and his testimony shows that several of the leased lines earned more than their rental. Counsel for the Schuylkill Valley Navigation Co. appeared before the Master, and asserted the right of that company to continue its proceedings now pending in court to enforce its right under the lease without prejudice from the present hearing. The Master stated that the proceedings would be so conducted as not to interfere with, or prejudice, the action of the Schuylkill Valley Co. The taking of testimony is still in progress.

**Pittsburgh & Lake Erie.**—In Pittsburgh, Feb. 9, the trial of the suit of Contractor B. J. McGrann against this company was begun. Mr. McGrann built the road under a contract by which he was to receive \$2,500,000, payable, \$1,150,000 in cash, \$1,150,000 in bonds, \$200,000 in stock of the company. He claims that alterations were made in the location of the road which considerably delayed the work; and also that cash was not paid on his contract as agreed, but that he was obliged to accept bonds for a part of the cash due him, and that to carry out his contract he was obliged to negotiate these bonds at a loss. For the changes and delays in the work, and for the substitution in the payment he claims \$600,000 from the company.

**St. Joseph & Des Moines.**—This road, which extends from St. Joseph, Mo., to Albany, 50 miles, was changed from 3 ft. to standard gauge Feb. 8, and trains of the new gauge

began to run over it the following day. The road is now controlled by the Chicago, Burlington & Quincy.

**St. Louis & San Francisco.**—An approximate statement of earning of this road for 1884 is given below:

Earnings.....	\$4,687,054
Expenses (52.5 per cent).....	2,463,086
Net earnings.....	\$2,223,968
Interest and sinking funds.....	1,575,000
Surplus for the year.....	\$648,968

This surplus exceeded that for 1883 by \$220,596, or 51.5 per cent. It was sufficient to pay 7 per cent. on the first-preferred stock and leave a balance of \$333,968, or about 3¼ per cent. on the ordinary preferred stock.

**San Antonio & Aransas Pass.**—This company is now discussing an offer from New York parties to build this projected road, which is to run from San Antonio, Tex., to Aransas Pass on the south coast. The original intention was to build this road as an independent line to be owned by local capital, but it has been impossible to raise the necessary funds in San Antonio.

**Sharon & State Line.**—This company has been organized to build a short railroad 2 miles long, running out of Sharon, Pa. The capital stock is \$60,000.

**Sheffield & Birmingham.**—The Alabama Improvement Co. has let a contract to Lenddermann & Co., of Tusculum, Ala., for the building of this road from Sheffield, Ala., to the Tennessee River. Work is to be begun at once.

**Shenandoah Valley.**—This company's statement for December and the year ending Dec. 31 is as follows:

December.		Year.	
1884.	1883.	1884.	1883.
Earnings.....	\$53,882	\$63,358	\$742,371
Expenses.....	50,745	54,248	613,015
Net earnings.....	\$3,137	\$9,110	\$129,356
P. c. of exps.....	94.3	85.5	82.6

For the year the gross earnings show a decrease of \$112,044, or 13.2 per cent., and the expenses a decrease of \$49,142, or 7.4 per cent., the result being a decrease of \$62,902, or 32.8 per cent., in net earnings.

**Storm and Flood.**—The roads northwest and west of Chicago and those leading eastward from that city suffered severely early in the week from a very heavy snow storm accompanied by high winds and extreme cold. Nearly all the lines of the Northwestern, the St. Paul, the Illinois Central and the Alton roads were entirely blocked and train movement was at an end for nearly two days. East of Chicago the Lake Shore, the Michigan Central and other lines were also badly blocked, and the roads were only cleared by very hard work. The wind drifted the snow badly and the intense cold made it very hard for the men to work.

In the East the storm took the form of a very heavy rain. Falling on hard-frozen ground, nearly all the water was turned at once into the streams, and in many places the floods were increased by ice-gorges. The worst effects of this storm were felt in New Jersey, Pennsylvania and Maryland, where many bridges were carried away or injured, and much other damage done. The new Philadelphia Branch of the Baltimore & Ohio felt the effects of the storm severely, its unfinished works being damaged at many points. In Northern New York this was a snow-storm and blocked the roads badly.

**Syracuse, Phenix & Oswego.**—The right of way and graded road-bed of the old company of this name have been purchased by A. S. Low, E. W. Paige and George Potts, who now propose to organize a new company, and offer to complete the road provided people along the line take \$30,000 in stock. The road, which was graded some 12 years ago, is to run from Syracuse, N. Y., to a point near Fulton, on the New York, Ontario & Western road, a distance of about 20 miles. It will make a new line from Syracuse to Oswego parallel to the present Oswego & Syracuse road.

**Troy & Greenfield.**—A dispatch from Boston, Feb. 11, says: "A bill has been prepared in which some of the features of the recent message of Gov. Robinson concerning the Hoosac Tunnel are included, and which will be presented to the Legislature within a few days. The bill referred to authorizes the incorporation of the Boston, Hoosac & Northwestern Railroad Co., with authority to issue \$15,000,000 of preferred and \$15,000,000 of common stock, and also bonds to the extent of \$15,000,000. The \$15,000,000 of common stock is to be given to the Commonwealth in exchange for the Troy & Greenfield Railroad and Hoosac Tunnel, and if within four months the Fitchburg Railroad fails to become consolidated with the new railroad, then the Boston, Hoosac & Northwestern company may construct a new railroad to Boston, or, if thought advisable, unite and consolidate with the Central Massachusetts, Boston & Albany, or New York & New England Railroad."

**Union Pacific.**—This company's statement for December and the year ending Dec. 31 is as follows:

December.		Year.	
1884.	1883.	1884.	1883.
Earnings.....	\$2,332,118	\$2,322,392	\$25,791,198
Expenses.....	1,157,209	1,451,190	14,014,458
Net earnings.....	\$1,174,909	\$871,202	\$11,776,740
P. c. of exps.....	49.6	62.5	54.3

For the year the gross earnings decreased \$2,924,941, or 10.5 per cent., and the expenses decreased \$1,043,225, or 6.9 per cent., the result being a decrease of \$1,881,716, or 13.8 per cent., in net earnings.

**Virginia Midland.**—It is said that negotiations are in progress for a closer connection of this road with the Pennsylvania Railroad at Alexandria, and for an exchange of traffic. The old contract, under which the Midland uses the Baltimore & Potomac depot in Washington, is to be replaced by new agreements.

**Wabash, St. Louis & Pacific.**—The Farmers' Loan & Trust Co., of New York, trustee, has filed in the United States Circuit Court a petition for leave to foreclose the mortgage on the Missouri, Iowa & Nebraska road, now a part of the Wabash system.

**Wilmington & Weldon.**—Surveys are now being made for the branch or cut-off from Wilson, N. C., to Fayetteville and thence to Florence, S. C., 112 miles. The existing line now runs due south to Wilmington and thence due west to Florence and Columbia, forming the perpendicular and base of a right-angled triangle, as it were. The new cut-off will form the hypotenuse of the triangle, and will shorten the through line considerably, besides opening up a new country, much of which is now remote from any railroad.

**Wind Gap & Delaware.**—All the injunctions obtained against the construction of this road have been dissolved by the court and there is no legal obstacle to the building of the proposed road, which is to extend the Lehigh & Lackawanna road from its present terminus to the slate quarries at Bangor, Pa. It is said that the construction of the new line will be begun as soon as the weather will permit.